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Heasman, Lael

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Efficacy of Following Directors Dealings - An Alternative Approach

Lael Heasman

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

Johannesburg, 2011

ABSTRACT

The purpose of this research report was to explore the efficacy of following directors' dealings. More specifically it tried to establish whether an outside investor could build a long term and profitable trading strategy on the JSE Securities Exchange South Africa (JSE) by trading only on receipt of an intense directors' dealing signal as the key strategy driver. Directors of companies on the JSE are obliged by regulation to report dealings in the shares of their own companies to the JSE. The theory is that directors have information which is not necessarily publicly available, against which they could trade in order to profit. If this is the case then an outside investor should also be able to profit when trading in line with this director activity. This report uses an alternative approach to the commonly used event study methodology. It instead uses a performance evaluation method on constructed portfolios to arrive at a result. The data used for this research included all dealings by directors from the Top 40 companies as listed on the JSE Main Board, between 2nd October 2000 and June 30th 2009, as announced through the JSE SENS service. The findings initially looked astoundingly positive with a 595.43% return over the study period when acting on signals embedded in directors' dealings, as identified by the proposed Outsider Portfolio Strategy. This translated to a 27.4% annual compounded return which is significant return on investment by any standards. It also ranked in the 95.8 percentile against 20,000 randomly generated portfolios which added further weight to the initial positive response. However, on investigation of the internal structure of that return, it was discovered that 36% of the return came from only one of the fifteen shares that triggered signals. Investigating that share, and others that delivered return, no correlation what-so-ever could be found between the periods of high performance for the shares, and the periods for which the Outsider Portfolio Strategy required the outside investor to be invested in those shares. As such the findings remain inconclusive and further investigation and research is recommended before any conclusive finding can be reached.

DECLARATION

I, Lael Heasman, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

……

Lael Heasman

Signed at ……

On the …….. day of …… 2011

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CHAPTER 1. INTRODUCTION

1.1. Purpose of the study

The purpose of this research report is to establish whether an outsider could build a long term and profitable trading strategy on the JSE Securities Exchange South Africa (JSE) by trading only on receipt of an intense directors' dealing signal as the key strategy driver.

1.2. Context of the study

This study is conducted on the set of directors' trades emanating from the top 40 companies on the JSE in South Africa.

Many studies claim that varying internal company characteristics or internal environmental variables could potentially signal more to the outsider than just the trade itself. These characteristics include, but are not limited to, the intensity of the trades (number of directors dealing or number/value of shares dealt), the type of director making the trade (Chairman or CEO vs. other 'lesser' directors), market capitalisation (company size), book to market ratios or price to equity ratios (value), industry (financial, resources, consumer), momentum (performance) etc. Two such studies have recently been conducted on the JSE. One by Mordant (2002), and the other by Mutooni (2001). The Mordant (2002) study, although it focussed on directors trades as the primary signal, only used a very small sample as it had only been a regulatory requirement to report directors dealings from the October of the year prior to when the data was collected. This study also factored out the size, value and resources effects and found that although *directors could benefit* in the short term, that there was *no clear strategy for outsiders* mimicking these trades. The Mutooni (2001) study was more focussed on the environmental effects and found significant evidence in their support over a substantial sample of trades from 1986 to 2000.

This research report will try to establish whether or not trading only on receipt of a signal indicating intense trading by directors will deliver superior profits to an outsider over the longer term.

There is much well documented empirical evidence that insiders benefit from their informational advantage when dealing in their shares of their own companies (Lorie and Niederhoffer 1968; Jaffe 1974; Finnerty 1976; Givoly and Palmon 1985; Seyhun 1986; Rozeff and Zaman 1988; Seyhun 1988; Lin and Howe 1990; Pope, Morris and Peel 1990; Gregory and Matako 1994; Bettis, Vickrey and Vickrey 1997; Gregory, Matatko and Tonks 1997; S. Chang and Suk 1998; Rozeff and Zaman 1998; Lakonishok and Lee 2001; 2002; Mordant 2002; Jeng, Metrick and Zeckhauser 2003; M. Chang, Murphy and Wee 2006; Fidrmuc, Goergen and Renneboog 2006; Betzer and Theissen 2008; Dickgiesser and Kaserer 2008).The researcher came across only Eckbo and Smith (1998) who believe there is no advantage to insiders dealing in the shares of their own companies. But the question is more subtle than that. Can an *outsider* mimicking these trades also benefit? Here the evidence is mixed with many reporting that outsiders mimicking the trades of insiders can realise profits, (Jaffe 1974; Seyhun 1986; Rozeff and Zaman 1988; Bettis et al. 1997; Mordant 2002) while others report that outsiders mimicking insider trades will hardly be able to profit (Dickgiesser and Kaserer 2008)

In their summary, Lakonishok and Lee (2001:107) claim “The perception of investors seems to be that insiders are better informed about the affairs of their companies, and hence there should be a way for outsiders to benefit from knowing what insiders are doing.” There is no refuting that directors have an intimate knowledge of the workings of their companies. In support of the buy side argument, directors understand when new product developments are looking promising long before market announcements; they understand when feasibility studies are pointing to positive ROI’s; when actual projects are delivering on time and in budget; and when large contracts are looking promising. In support of the sell side argument, they understand when warehouses are backing up with stock; when costs are increasing; when sales are slacking off; when labour disputes are threatening; or when major contracts

are lost or in jeopardy. All of these over the long term will impact on the share price of that company. If this is the case, then a director dealing in his/her own shares should enjoy superior profits to those who can only trade once this information is out in the market. And even then, when a director does trade, the market is often unaware of his reasons for trading and can only react speculatively to this 'new information' indicated by the trade. It is only down the line, once information is fully revealed, that the market can efficiently adjust to reflect the true value of the information, and perhaps retrospectively we can understand the motivation for the original trade. See Jensen (1968) and Fama (1970) for discussion on Market Efficiency Model.

Understanding that directors hold inside information, stock exchange regulatory bodies try to prevent abuse of this information through regulation. It has thus been a JSE listing requirement since 2nd October 2000 (Mordant and Muller 2003) that directors should disclose dealings in shares related to their company. If a director deals, the director must supply the required information to the issuer "without delay, and in any event by no later than 24 hours after dealing" (JSE 2011:3.65). The issuer is then bound to announce this information through the JSE's Stock Exchange News Service (SENS) "without delay and in any event by no later than 24 hours after receipt of such information from the director concerned" (JSE 2011:3.65). This implies a worst case scenario delay of 48 hours between a director dealing, and that trade becoming public knowledge through SENS. Using data originally derived from SENS, from the date of implementation of this regulation through to June 2009, this report will retrospectively look for strength, or intensity, in the buying or selling activity by directors of a company in order to trigger a buy or sell signal to an outsider. Calculation of returns as a result of these triggers will establish if that outsider can profit abnormally.

1.3. Problem statement

The purpose of this research report is to ascertain whether outside investors can earn abnormal excess returns over the longer term, by purchasing a share

after intensive directors' purchase activity, and selling the share after intensive directors' sales activity.

1.4. Significance of the study

The study fills a gap in that it adopts a new approach to investigation of the efficacy of directors' dealings. A like study has not been done in the South African market before now.

An understanding of these research results should inform potential investors as to the long term profitability of trading strategies based on signals embedded in intensive trades by directors.

The study will also provide insight into the behaviours of directors with regards to dealing in the shares of their own companies, and highlight similarities and differences between directors of companies listed on the JSE and directors of companies on various stock exchanges elsewhere in the world.

This research report also seeks to contribute to the debate around the profitability of directors' dealings and thus the efficiency of the market as it pertains to the JSE. This knowledge would then advise of the appropriateness of regulations imposed by the JSE with regards to directors' dealings.

1.5. Delimitations of the study

- The study will be restricted to trading in the South African market as it will be carried out on shares of the JSE only.
- It will also focus specifically on directors' dealings that occur only on the Top 40 shares on the Main Board Market of the JSE.
- This study will use purely quantitative methods. It will specifically ignore any fundamental information which may be available in the market. It should be noted however that this type of information could well impact results and could be included in future research.

1.6. Definition of terms

Insider	"A person having a privileged relationship with the company" (Mordant 2002) "'Corporate insiders' include officers with decision-making authority over the operations of the company, all members of the board of directors, and beneficial owners of more than 10% of the company's share." (Jeng et al. 2003). In the case of the JSE, it would include all executive and non-executive company directors.
Outsider	A person without a privileged relationship with the company. Also called outside investors (Mordant 2002)
Abnormal Returns	For the purposes of this report abnormal returns will be defined as returns of a share over and above returns achieved by an equal investment in either the market or a constructed industry portfolio.
Directors Dealings	Share purchases and sales by directors, both executive and non-executive, in the shares of the companies on whose boards they sit (Mordant 2002)
Directors' Effect	The cumulative impact of directors' share transactions on subsequent share returns (Mordant 2002)
Growth Share	A growth share is considered to be a share with a low book to market ratio (Fidrmuc et al. 2006)

Value Share	A value share is considered to be a share with a high book to market ratio (Fidrmuc et al. 2006)
Intensive Directors' Dealing Signal	For the purposes of this research report an intensive trade signal will be triggered when there are 3 or more directors trades in the shares of their company on the same day, where the total value of director's trades on one day exceeds R5 million, or trade type (either buy or sell) persists exclusively over a period.

1.7. Assumptions

- The Top 40 companies on the Main Board Market of the JSE are a wide enough sample from which to draw conclusions for the purposes of this research report
- Directors trades reported from October 2002 to June 2009 is a long enough period over which to understand the long term profitability of the strategy
- Share prices fully reflect all obviously publicly available information i.e. the market is at least semi-strong form efficient as per the efficient market hypothesis (Fama 1970; Jensen 1978)

CHAPTER 2. LITERATURE REVIEW

2.1. Introduction

This literature review will look at past research to explore findings relating to outsiders profiting abnormally when mimicking the trades of directors dealing in the shares of their own companies.

Section 2.2 below addresses mainly factors internal or specific to the company itself and tries to understand if knowledge of these factors can inform a profitable trading strategy.

2.2. Abnormal Returns from Directors' Dealings

Research into abnormal returns achieved by directors can be characterised in many different ways, highlighting different aspects of the trades that researchers believe lead to profitability. Some of the earlier studies simply explored the case of profitability or not, but the width and depth of research expanded quite significantly as time progressed. This section attempts to explore each of these characteristics or factors, whilst adhering to timelines in an attempt to inform the reader as to the evolution of developments in the field.

2.2.1. No Abnormal Returns

Although it does exist, there is very little research finding that insiders do not in fact earn abnormal profits. The following simple acknowledgment of these dissenting voices is as far as this research report will go, as it is the overwhelming evidence to the contrary that will remain the focus.

Jaffe (1974) reports earlier research conducted by Scholes (1972), Wu (1972) and Driscoll (1956) in the US who all found no evidence of forecasting by insiders and thus by implication no attributable abnormal returns. The only other counter-example found was a study by Eckbo and Smith (1998) who found that

insiders of companies listed on the Oslo Stock Exchange did not earn abnormal profits.

The balance of this research report will focus on the myriad of studies that have been conducted on securities exchanges around the world, all providing evidence that insiders are in fact better informed than the market and thus earn abnormal returns. It is also interesting to explore the progression of research and the new 'factors' introduced as time progressed, and it is this which is presented below.

2.2.2. Size and Timing of Abnormal Returns

In terms of timing Fidrmuc et al. (2006) categorised all research into two main camps. One camp argues that price reaction to insider trading is gradual and occurs over time while the other argues for market efficiency and attempts to measure price reaction on and around the date of the announcement of the insider trade. This research report tends to align with the ideas of the first camp and the longer term adjustment, and thus this research will be discussed first.

One of the earliest studies conducted on the New York Stock Exchange by Lorie and Niederhoffer (1968) found that intensive accumulation of a share by insiders led to an outperformance of the market in general over the next 6 months, and that insiders tended to buy more often than usual before large price increases. They also found the expected converse on sales and concluded that prompt analysis of these trades by outsiders could be profitable. Many agree with Niederhoffer's claim of superior knowledge of insiders including Jaffe (1974), who concluded that outsiders can profit when acting quickly after publication of the "Official Summary" (the official US Securities and Exchange Commission (SEC) publication), but only in intensive trading samples with an 8-month holding period, as transaction costs wiped out profits in other trading samples.

These early studies found differing returns over differing periods. Jaffe (1974) estimated insiders' gross abnormal profits to be 2% over two months and 5% over eight months following intensive trading periods, and that an outsider who

imitates insiders with a two-month delay could also earns 5% over the next eight months. Finnerty (1976) found similarly on the New York Stock exchange that most of the returns were realised in the first 6 months, with the first month being the most profitable for buy trades, while sell returns took place uniformly throughout the subsequent months. They found between 4.8% and 8.3% abnormal returns over an eleven-month period. Givoly and Palmon (1985) found that cumulative abnormal returns over 240 trading days (about a year) was 8.6%, with that for sales at 11.53%. Although they did not test for returns to outsiders, they believed that the significant abnormal returns in the wake of these insider trades lent support to the conjecture that outsiders accept this superior knowledge and trade similarly and thus proposed further research into the phenomenon. Lakonishok and Lee (2001) agreed with the longer term timing of the above researchers suggesting that the market under reacts to this information and that there are definite opportunities for outsiders mimicking these trades.

Another group of researchers assume that the market is semi-strong or strong form efficient and will adjust quickly to the new information. They focus on abnormal returns over the much shorter term focusing on the day of the announcement of the insider trade. These include the likes of Chang and Suk (1998), Friederich et al. (2002), Fidrmuc et al. (2006), and Klinge, Seifert and Stehle (2005).

2.2.3. Type or Position of the Insider

Seyhun (1986) found support for the above findings but added a new dimension to research. They claimed and found support for the fact that different types of insiders possessed differences in the quality of their information. Insiders who were expected to be more knowledgeable with the overall affairs of the company, such as chairmen or officer-directors, were more successful predictors of future abnormal share price changes than lesser officers or shareholders. They termed this the Informational Hierarchy Hypothesis. This hypothesis was confirmed by Lin and Howe (1990) on the US Stock Exchange

when they found that those in higher positions earned larger returns on their purchases, but not on their sales.

Jeng et al. (2003) found contrary to the Informational Hierarchy Hypothesis and proposed that this might have been due to the fact that CEO's are more likely to be more carefully scrutinised by analysts and regulators and thus may be more reluctant to trade on their informational advantage. Fidrmuc et al. (2006) agreed and also proposed that the positive news associated with purchases of shares was toned down by the negative news that the CEO strengthened his control over the company to a level that caused entrenchment.

Fidrmuc et al. (2006) believed that the earlier findings of Seyhun (1986) and by Lin and Howe (1990) may also have been clouded by the fact that the CEO trades were in any case large (on average twice as large as those by other directors), and it could have been their size rather than the position of the director that was informing the larger returns. They concluded that CEO purchases that are accompanied by purchases by other directors have higher information content than do purchases by the CEO alone.

Dickgiesser and Kaserer (2008) have recently found support for the Informational Hierarchy Hypothesis' on the German bourse with members of the executive board achieving greater abnormal returns and thus existing higher in the hierarchy, than those on the supervisory board or management. This was confirmed by Betzer and Theissen (2008) who claim that trades by the CEO, by ordinary members of the executive board, and by the chair of the supervisory board tended to have higher returns than those by members of the base group (family members and other persons required to report their trades). But they went on to also confirm the Jeng et al. (2003) and Fidrmuc et al. (2006) findings that trades by the CEO appeared to have a smaller price impact than trades by other members of the executive board and proposed similar reasoning.

2.2.4. Intensity of the Insider Trades

Information contained in the intensity of trades by directors was perceived early on to have a significant impact on the size of returns. Lorie and Niederhoffer

(1968) defined intensive trades as those that met the following three criteria: (1) They were purchased by three or more insiders within one month. (2) They were sold by no insiders in the month of intensive purchasing. (3) At least two purchasers increased their holdings by more than 10%.

2.2.4.1. Number of Directors

Jaffe (1974) found that profitable trading strategies could only be developed on the basis of information seeming to reflect a 'consensus' view about the likely future performance of a share and thus focussed on the number of directors trading (Pope et al. 1990). This finding was also supported later by Lin and Howe (1990) who defined an intensive purchase month as one in which a share has three or more purchases and no sales by insiders and an intensive sales month as one in which a share has three or more sales and no purchases by insiders. When Pope et al. (1990) investigated abnormal returns they excluded “low intensity” events which they described as events where the net number of buyers or sellers was less than two, taking this justification from the Jaffe (1974) finding discussed above.

2.2.4.2. Size of the Transaction

Givoly and Palmon (1985) noted that the size of the transaction had an impact when they found that large insider transactions were more profitable than small ones. Seyhun (1986) found evidence that insiders can discern differences in the value of their information and trade greater volumes of shares to exploit more valuable information.

2.2.4.3. Both

Lakonishok and Lee (2001) combined the effects of number of directors and size when they found that higher returns were achieved when at least three different directors purchased sizeable amounts in small companies, but did not find this effect for either large companies, or for sale trades.

Jeng et al. (2003) summarised intensive-trading criteria from previous studies as either a month in which at least three insiders bought the share and no insiders sold it, or alternatively a month in which the net number of shares purchased and sold by insiders indicated either a buy or sell signal. However they found many issues with these definitions, and the subsequent returns found in the studies.

Fidrmuc et al. (2006) found overwhelmingly in favour of much greater cumulative average abnormal returns after larger purchase and sale trades, than smaller ones, stating that clearly, multiple trades by several directors gave more credibility to the signal. This has been confirmed very recently by Dickgiesser and Kaserer (2008) although only for purchases and not for sales. This is a claim also supported by Betzer and Theissen (2008) who both conducted their studies on the German bourse.

2.2.5. Size and Value Effect

The next progression in research attempted to explain that the returns experienced by directors were not all due to their superior knowledge, but that other factors might be at play. A Rozeff and Zaman (1988) study conducted from 1973 to 1982 found that after size and value effects had been removed, a moderate 3% - 3.5% per annum abnormal return was achieved by insiders, and that profit to outsiders all but disappeared after transaction costs had been paid.

Each of these two effects will now be discussed.

2.2.5.1. Size Effect

The size effect relates to the market capitalisation of the company. As early as 1985 when Givoly and Palmon alluded to the size effect when they commented that their greater abnormal returns may in fact have been due to their sample being taken from the relatively smaller AMEX-listed companies while the Jaffe (1974) and Finnerty (1976) samples consisted of much larger capitalisation companies. This perception was confirmed shortly afterwards by Seyhun (1986), and in the 1988 study by Rozeff and Zaman. Lakonishok and Lee

(2001) believed this was because larger companies are priced more efficiently leaving the potential for profits from insider trading to the more inefficient smaller cap companies. Chang et al. (2006) went one step further to suggest that the reason for this size effect was that the insiders of smaller companies may have greater private knowledge as a result of fewer analysts following the company. The size effect has been most recently confirmed, once again, by Dickgiesser and Kaserer (2008) and Betzer and Theissen (2008) on the German bourse.

Jeng et al. (2003) could not confirm these findings. Although they agreed that insiders disproportionately purchase shares in small, value companies, that have recently underperformed, and that sales are made mainly in growth companies that have experienced high recent returns, they put this down to the fact that insiders simply have a good feel for near-term developments within their company, and/or that actions by others who follow their trades move the market. They thus proposed against the size effect, claiming that any abnormal returns found were more down to the nature of the study used to arrive at the result, and not the company size.

2.2.5.2. Value Effect

A value share is considered to be a share with a high book to market ratio whilst a growth share would exhibit a low book to market ratio (Fidrmuc et al. 2006). The Rozeff and Zaman (1988) study found that insider buying would increase as shares moved from growth to value, and after low share returns. Conversely selling increases as shares moved from value to growth and after high share returns. This finding has since been independently confirmed by a number of researchers (Lakonishok and Lee 2001; Friederich et al. 2002; M. Chang et al. 2006; Fidrmuc et al. 2006) who all agree that directors only purchase shares when they believe it is undervalued according to measures such as book to market and with poor past performance.

Dickgiesser and Kaserer (2008) viewed this debate from another angle but still arrived at the same conclusion. They saw that value shares purchases were followed by larger share price moves than growth share purchases and again

the vice versa on the sales. They thus concluded that insider trading signals seemed to move share prices less where valuations were already exceedingly high. Also, that traders seemed to be more sensitive to negative signals in high growth shares as it was assumed that these shares may be associated with a greater risk.

2.2.6. Differences between Returns on Purchases and Sales

A number of researchers, as has become evident from prior discussions, focussed on differences between directors' purchase and directors' sale trades.

Jeng et al. (2003) found that purchase portfolios earned raw abnormal returns of 11.2%, but that sales portfolios did not perform in excess of the general market. This finding was supported by Lakonishok and Lee (2001) for US companies and Friederich et al. (2002) for UK companies. Fidrmuc et al. (2006) propose that this effect may be due to the fact that markets attach less informational content to sales because part of the sales may be made due to directors' liquidity needs rather than bad insider news. They go on however, to say that the negative signal of directors' sales is much stronger in smaller companies and that this may be due to the higher uncertainty and the lower availability of information about smaller companies as, for instance, they are followed by fewer analysts.

A most recent study on the German bourse by Betzer and Theissen (2008) showed almost equal returns after purchases of 2.52% and after sales of -2.4%.

Gregory et al. (1997) believe these findings may be influenced by the type of study used. They found that 'conventional' event study methods supported abnormal returns for both purchases and sales, but when the size effect was removed, it was only purchases that were significant.

Pope et al. (1990) on the British bourse found quite to the contrary that it was the negative abnormal returns following directors sales which were significant. This has recently found support on the German bourse from Dickgiesser and

Kaserer (2008) who also found that insider sales were followed by greater abnormal returns than insider purchases.

2.2.7. Industry

A little researched characteristic is that of industry. Again it was Givoly and Palmon (1985) who first alluded to an industry effect. They agreed with the phenomenon of abnormal returns to insiders but proposed that this return might vary among industries. Gilbertson and Goldberg (1981) as quoted in Mordant and Muller (2003) found a definite resources effect on the JSE. This they believed was due to the fact that mining companies made up a sizeable portion of the shares listed on the exchange. This was confirmed by Van Rensburg (2001), also quoted in Mordant and Muller (2003).

2.2.8. Past Performance & Financial Distress

The effect of past performance has already been briefly addressed within a number of the previously discussed characteristics, most notably the value effect. Lorie and Niederhoffer (1968) alluded very early to the fact that insiders tended to buy more often than usual before large price increases. Many more agree that directors only purchase shares when they believe it is undervalued, according to measures such as book to market ratios, and with poor past performance (Lakonishok and Lee 2001; Friederich et al. 2002; M. Chang et al. 2006; Fidrmuc et al. 2006). Fidrmuc et al. (2006) found reaction to directors' purchases (or sales) significantly positive (or negative) for poorly performing companies and those close to financial distress. Thus, in situations of poor performance and near-insolvency, the market interprets purchases as strong positive signals.

Dickgiesser and Kaserer (2008) also found support for this effect on the German bourse. They agree that past returns are powerful in explaining returns to insider trading. But when they explored the relationship of interest coverage as an indicator of financial distress of the company to abnormal returns, they found that if a company's interest coverage ratio was below one, positive

purchasing signals are met with caution and abnormal returns are smaller than otherwise. Sales, on the other hand, conveyed an additional negative signal for a company already in jeopardy.

2.3. Conclusion of Literature Review

The above literature review has reviewed much of the available research on the profitability of directors dealing in the shares of their own companies, and the impact on outsiders mimicking those trades.

The resulting research question to be addressed in this report is as follows:

Can outside investors earn abnormal excess returns over the longer term, by purchasing a share after intensive directors' purchase activity, and selling the share after intensive directors' sales activity?

CHAPTER 3. RESEARCH METHODOLOGY

This chapter will describe the research methodology, design, population, sample, data collection methods and finally the proposed data analyses.

3.1. Research Methodology

Profitability of directors' trades is typically investigated using the event study methodology. Bowman (1983) describes an event study as one that involves the analysis of share price behaviour around the time of an information announcement. This methodology was recently used in research done by Mordant (2002) on directors' dealings on the JSE. Event study methods are appropriate in investigating the short term returns on or around the event.

This study however, uses an alternative approach which found its roots in the early works of Basu (1977). Basu made use of a performance evaluation methodology on constructed portfolios over much longer periods. Elements of this methodology were also adopted by Finnerty (1976), Eckbo and Smith (1998) and Jeng et al. (2003) in their studies. The method aims to examine the mathematically calculated returns of different constructed portfolios to determine the outperformance of one portfolio against another over time.

This is appropriate in support of the focus of this research report in that it attempts to find a simple trading strategy for outsider investors to follow, by mimicking the trades of directors as reported to the regulatory authority. That implies that no fundamental knowledge of the companies or the market would be required. A basic understanding of share portfolios is all that would be required to understand the approach. Also, simple quantitative data sources indicating date of the deal, director, quantity of shares bought or sold, and the price would be sufficient for analysis.

3.2. Research Design

The purpose of this research is predictive in that it attempts to build a trading strategy that would statistically deliver out performance when trading in line with

directors' trades in the future. The methodology employed will use purely quantitative methods (as opposed to qualitative), thus it relies on the analysis of purely numerical data. It will ignore any and all fundamental data available, including context, opinion, status or other such qualitative impacts. Graphical analysis, simulation, descriptive statistics and modelling are all used to arrive at a result.

The study will be longitudinal running from Oct 2001 through to Jun 2009. The data will be sourced from documentary or archival sources, and the proposed trading strategy will be applied ex post facto to the directors' dealings as they happened over those eight years under study.

3.3. Population and Sample

3.3.1. Population

The population will include all dealings by directors from the Top 40 companies as listed on the JSE Main Board, between 2nd October 2000 and June 30th 2009, as announced through the JSE SENS service.

The sample start date, 2nd October 2000 coincides with the implementation of the regulations requiring directors to disclose all dealings in shares of their own companies through the JSE SENS service. The sample end date represents the start date of this study.

3.3.2. Sample and Sampling Method

South Africa has various data service providers who translate the SENS announcements into databases for sale to the public. Several of these databases were reviewed, but very low levels of correlation between the data sets were found on a number of levels. For example, trades across databases were reported to occur on different dates typically on or around the actual date of the trade. Some databases reported trades where others did not. There were often differences in the reported quantity or price of shares traded. Often, the nature of the trade (buy, option, or sell) was reported differently for the same

trade across databases. The high volume of trades transacted during the study period made it impractical to confirm each trade against the source data (SENS) to arrive at one correct database of trades from those databases which were available commercially.

An attempt was made to build a clean data set using programmatic, logical string recognition methods to process the raw text of the SENS announcements. However, there was also very little consistency in the sentence structure or the terminology used across announcements. For example, the following samples indicate the many different means by which a director's deal could be represented in SENS and this list can in no way be assumed to be exhaustive:

- Dealings by directors
- Director dealing
- Directors dealings
- Director`s dealings
- Dealing in securities
- Dealings in securities
- Dealings of director
- Rule 3.63
- 3.63 - 3.74
- 3.63 to 3.74
- 3.63 to 3.65
- Paragraph 3.66
- Paragraph 3.63

This made it impossible to logically and reliably extract the required base data from these text strings. Once again, the immense volume of announcements prevented a manual parse of these announcements to extract a data set as it would have consumed an inordinate amount of time.

As the intent of the report was to find a simple trading strategy for an outsider, it follows that data should be easily available and in the correct format allowing simple analysis. As such inconsistencies across the commercially available

databases were ignored and only one reputable data provider was eventually used, thus accepting that inconsistencies between any database and the source (SENS) would exist. It should be noted however, that this decision would in all likelihood detract from the eventual reliability of the findings herein.

The researcher finally selected, McGregor BFA (Pty) Ltd, and procured the following data sets:-

All “Directors Dealings” for the period of interest including the Deal Date, Company, Share Code, Director Name, Director Position, Volume of Shares Transacted, and Price.

“Daily Share Prices” for all shares on the JSE for the period of interest including Date, Company, Share Code, Opening Price, Closing Price and Volume Traded.

To deal with obvious anomalies in the BFA data set:

- Where prices were encountered that were in the order of magnitude of 10 or 100 or 1000 times the price of the previous day’s closing price, these were assumed to be data capture errors and adjusted downwards accordingly.
- Where trades were transacted at way above the closing price of the share for the day, but not in the orders of magnitude as described above, these trades were simply excluded from the study.

The set of trades was assumed to be the full set of trades as transacted on the JSE and reported by SENS. In the event of using the data to run a real portfolio, the actual triggers could be validated against the SENS announcements for validity.

3.4. Data Analysis and Interpretation

The complete sample of directors’ dealings in companies from the Top 40 companies on the JSE were used. This sample was analysed to extract intensive trading signals that acted as triggers to which the outside investor

should have reacted. The following sub-sections outline the approach taken to arrive at the validated triggers (details represented in Appendix A hereto attached).

3.4.1. Graphical Analysis

Appendix A (on the CD attached) presents a detailed set of graphs on a company by company basis to illustrate share performance and directors' dealing activity in those companies in order to identify intensive trading signals as follows:

The first graph per company, "Share Price and Volumes", charts the average closing share price and the total volume of shares traded per quarter.

The second graph "Total Dealings Summary" charts the total deal value on the day and the number of deals making up that value. Only high value deals (deal value signal), a number of deals on any one day (number of deals signal), and consecutive deals of the same type (consecutive buy or sell deal signal) were assessed for qualification as signals.

The next three graphs drill down into the detail underlying the "Total Dealings Summary" described above.

The "Price Comparison" graph compared the closing price of the share on the day to the average price at which the deals were struck on that day, categorised into Buy, Option, and Sell deals. Only deals which were struck at or very near to the closing price on the day qualified as signals. Those that differed were assumed to be either share options (typically issued below par price) or data errors and were thus ignored.

The "Deal Value" graph split the total deal value into its three component parts namely, Buy, Option, and Sell.

The "Deal Qty" graph split the number of deals into its three component parts namely, Buy, Option, and Sell.

Examples of these graphs can be found within this text in the discussion of results from pages 53 to 64.

3.4.2. Intensive Trading Signals

The following intensive trading signals were defined:

‘Number of deals’: three or more buy or sell deals on one day, at or near to market closing price. Deal dates which were followed in the next two weeks by an opposite transaction (a buy date after a high quantity sell date, or a sell date after a high quantity buy date) were disqualified as signals. This signal was inspired by Jaffe (1974) who found that profitable trading strategies could only be developed on the basis of information seeming to reflect a 'consensus' view about the likely future performance of a share (Pope et al. 1990).

‘Deal value’: High-value buy or sell deals totalling more than R5 million transacted on one day at or near to market closing price. Deal dates which were followed in the next two weeks by an opposite transaction (a buy date after high-value sell date, or a sell date after a high-value buy date) were disqualified as signals. This signal is supported by both Givoly and Palmon, and Seyhun. Givoly and Palmon (1985) found that large insider transactions were more profitable than small ones. Seyhun (1986) also found that insiders can discern differences in the value of their information and trade greater volumes of shares to exploit more valuable information.

Both of the above signals, ‘Number of Deals’ and ‘Deal Value’, are supported by Lakonishok and Lee (2001) who first combined the effects of number of directors and size. They found that higher returns were achieved when at least three different directors purchased sizeable amounts.

‘Consecutive deals’:

‘Consecutive buy deals’: 3 or more consecutive dates with buy deals only, over any period. This signal was inspired by the Lorie and Niederhoffer (1968) definition of an intensive trade signal being one where three or more insiders purchase within one month.

‘Consecutive sell deals’: 5 or more consecutive dates showing sell deals only, over any period. A higher threshold was used for the consecutive sell deal signal due to the fact that directors can sell for many more reasons other than just to profit. For example a director may simply want to convert his shares to cash purely for liquidity reasons, regardless of whether or not he was to profit from the transaction. This view was inspired by Fidrmuc et al. (2006) who propose that markets attach less informational content to sales because part of the sales may be made due to directors’ liquidity needs rather than bad insider news.

Any date showing option and sell deals on the same day, or buy and sell deals on the same day, were disregarded as possible signals.

3.4.3. Portfolios

A number of portfolios were constructed as per the studies of Finnerty (1976), Eckbo and Smith (1998) and Jeng et al. (2003).

Firstly, a cash only portfolio was constructed to understand expected return over the study period had the outsider left the investment in the bank. For this portfolio, an interest rate of Prime minus 4 was assumed as a reasonable proxy for the interest rate one could have expected from an investment in a banking instrument. This was based on average banking rates offered lagging prime by 4% on average. This interest was accrued on a daily basis and thus growth of the portfolio was exactly equally to the compound interest received on the cash invested.

Secondly, a number of market-index only portfolios were analysed, namely J200 (Top 40 Index), J203 (All Share Index), J250 (SA Financial and Industrial Index), J550 (Consumer Services Index), and J177 (Mining Index) to understand the returns that could have been expected had the outsider invested in those indices exclusively. These selected indexes were assumed to be good proxies for the population of shares under study.

Finally, using the triggers identified above, an ‘Outsider Portfolio’ was constructed. At any stage of the study period where no triggers or ‘buy’ status companies were in play (specifically the early stages waiting for the first ‘buy’ trigger), the full portfolio value was simply held in cash. Shares were then bought two weeks after receipt of any intensive buy signal or trigger from the directors of any company. This position was held until two weeks after receipt of an intensive sell signal, or reversal trigger as discussed by Kaneko and Lee (1995), was realised, upon which shares in the triggered company were sold. The shares included in the Top 40 together with their market cap weightings as at June 2009, were used as a proxy for the entire period. The investment amounts in individual shares were permanently market cap weighted to this set of shares as at June 2009. In essence, the principal behind this approach was to overweight the shares in buy status and underweight the shares in sell status. This process is repeated for all identified signals until the end of the study period when all open positions were closed out at the market price on 30 June 2009.

The overall return of the portfolios, from inception, through to the end of the study period, was used as an indicator of outperformance of one portfolio against another.

It is important to note that all portfolio returns calculated are exclusive of fees, expenses, and trading costs (otherwise known as transaction costs). In real-terms these costs would typically reduce the actual returns from the portfolio. Although this approach may overestimate the returns from any one portfolio, the approach remains appropriate in that all portfolio returns calculated, similarly ignore these transaction costs.

3.4.4. Monte Carlo Simulation

Once the return of the Outsider Portfolio was established, a Monte Carlo Simulation was run to test the probability of that return happening by chance, by running 20,000 random portfolios built along the same premise as the Outsider Portfolio.

3.4.5. Return Structure

The structure of the return to the Outsider Portfolio was investigated by looking at the contribution of each of the triggered shares to the total Outsider Portfolio return.

3.5. Limitations of the Study

Potential limitations of this study include the following:

- Time Period – 8 years is a relatively short period of time over which to observe long-term profitability of a portfolio of shares through mimicking directors' trades. In South Africa, this is the only time period for which data is available and thus serves as a limitation to the study.
- Geography – Due to the high volumes of data available, and the low levels of data integrity suspected, this study was limited to the Top 40 companies of the JSE only. With improved data integrity, and better structure, more programmatic approaches could be used over a much larger data set incorporating all companies on the JSE, and could easily be translated to other exchanges.
- Boom – The entire period under review was representative of a boom period in South Africa. Results may differ across varying business cycles.
- Unemployment - South Africa is inflicted with an abnormally high rate of structural unemployment which is commonly quoted as an indicator of performance on stock markets. The impact of unemployment rates on the JSE maybe not be representative across other exchanges, and thus could yield differing results

3.6. Reliability and Validity

Reliability and validity are integral to the integrity of any research report. Validity describes the extent to which an instrument measures what it is intended to measure, while reliability has more to do with the actual accuracy

and precision of the instrument used. Research results could be considered to be “reliable, but not valid”, but could not be considered to be “valid, while not reliable”.

3.6.1. External Validity

External validity refers to the external integrity of the results and more specifically, to the generalisation of the results beyond the scope of the research itself. In this case, it refers to validity of the results for shares beyond those in the Top 40 of the JSE, or shares on stock exchanges other than the JSE. In other words, could the study be repeated on the JSE Alt X, the JSE Mid-Caps, or even the London or New York Stock Exchanges and deliver a similar result?

The sample that will be used in this report is restricted to the shares of the Top 40 on the JSE and thus could probably not be generalised across markets of the world. The external validity of this research could not be assured as different markets, and different environments may produce different trading behaviours in directors. For example, directors of the Top 40 companies, with a high level of analyst focus and attention, may be reluctant to trade in the shares of their own company for fear of falling foul of regulations. This behaviour might not be the case for directors of companies on the Alt-X as there are much lower levels of analyst and regulatory focus and attention on those smaller companies and start-ups. That is, the same study might produce a positive result on the one sector, but negative on the other. Also, the JSE operates in an emerging market economy which is entirely different to a first world economy, and thus the fundamentals of the market change. As such, a similar result could probably not be assured on the NASDAQ or the Dow Jones. By the same token, the results could not be denied either. Each market would need to be tested individually.

3.6.2. Internal Validity

This focuses on the internal integrity of the results and more specifically the extent to which one is able to draw accurate conclusions. This means as far as

possible removing extraneous factors that may influence the results for reasons other than those intended to be measured.

Internal validity can be explained from the following three angles:

- Content or Face Validity – This refers to the extent to which the measuring instrument provides adequate coverage of the topic under study. This research is using analytical, statistical and modelling techniques to measure return based on a prescribed trading strategy. Return is a calculation in Rands and Cents and as such the content validity cannot be denied.
- Criterion-Related Validity – This refers to the success of the measures used for some empirical estimating purpose. Two broad cases are found. differing in time perspectives:
  - Predictive Validity which is the ability of the instrument to quantify future behaviour or preferences, and
  - Concurrent Validity which is the degree to which the variable of interest can be predicted by the simultaneous measurement of another variable (proxy).

  As this research is based on the stock market in South Africa, it cannot be said that results of this research can in any way predict future results. The research has been conducted retrospectively on past data.
- Construct Validity implies that the instrument must result in similar result to other instruments. In this case, the calculations are all computational and will result in the same answer no matter how many times you calculate.

3.6.3. Reliability

Reliability deals with the actual accuracy and precision of the instrument used, or the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects. As discussed above, very low levels of correlation between the available data sets casts some doubt onto the reliability of the result. It was eventually resolved to pick and use only one data source. Even then, there were issues with the numbers, which in many

cases could be manually corrected, but in some cases had to be excluded from the data set. Beyond that issue, the methods used in this report were entirely computational and as such the same result will be achieved over the same data set each and every time it is calculated. It thus could be described as being highly accurate and precise. This highly analytical approach employing performance evaluation methods replicates methods used on many other stock exchanges around the world, and is expected to support the reliability of the research.

CHAPTER 4. RESULTS

4.1. Introduction

This chapter will present, describe and explain the results achieved.

In answer to the research question, this chapter will first present the triggers identified through a graphical analysis of each company. This is followed by a comparison of the returns of the different portfolios constructed using cash, market indexes and finally the triggers identified for the Outsider Portfolio. Next the results of the Monte Carlo Simulation are presented, followed finally by an analysis of the internal structure of the returns to the Outsider Portfolio.

A final summary section will summarise the results as found.

4.2. Results pertaining to the Research Question

4.2.1. Graphical Analysis

A company-by-company graphical analysis of directors' trades across the study period was conducted. The trigger conditions as described in the Chapter 3 above were applied to each company in order to identify trigger conditions. The results of this analysis can be reviewed in Appendix A on the CD attached hereto.

4.2.2. Intensive Trading Signals

The graphical analysis produced a number of triggers indicating intensive trading signals by directors. The table below lists all of the validated triggers that were identified across the study period. The companies are listed in their Top40 rank order from largest company to smallest by capital. Only companies that triggered intensive directors' dealings based on the triggers defined in Chapter 3 are listed. For each company that triggered, the table below indicates the company, share code, deal type (Buy or Sell), the trigger date, and the trigger rule that applied.

Table 1: Triggers Identified from Intensive Trade Signals

Company	ShareCode	DealType	FullDate	DealType
MTN GROUP LIMITED	MTN	Buy	07-Oct-08	deal value
ANGLO PLATINUM LTD	AMS	Buy	06-Jun-06	no of deals
ANGLO PLATINUM LTD	AMS	Sell	17-Aug-06	deal value
ANGLO PLATINUM LTD	AMS	Buy	08-Mar-07	no of deals
STANDARD BANK GROUP LTD	SBK	Buy	30-Oct-07	3rd consecutive buy
STANDARD BANK GROUP LTD	SBK	Sell	03-Oct-08	deal value
NASPERS LIMITED	NPN	Buy	01-Oct-02	deal value
NASPERS LIMITED	NPN	Sell	17-Dec-04	deal value
ANGLOGOLD ASHANTI LIMITED	ANG	Buy	01-Aug-08	3rd consecutive buy
ABSA GROUP LIMITED	ASA	Buy	22-Nov-05	no of deals
NEDBANK GROUP LIMITED	NED	Buy	10-Jun-05	no of deals
NEDBANK GROUP LIMITED	NED	Sell	26-Mar-09	5th consecutive sell
REMGRO LIMITED	REM	Buy	04-Feb-03	number of deals
REMGRO LIMITED	REM	Sell	03-Feb-04	number of deals
REMGRO LIMITED	REM	Buy	27-Jul-04	number of deals
AFRICAN RAINBOW MINERALS LIMITED	ARI	Buy	21-Dec-04	number of deals
AFRICAN RAINBOW MINERALS LIMITED	ARI	Sell	24-Oct-05	5th consecutive sell
RMB HOLDINGS LIMITED	RMH	Buy	26-Oct-06	3rd consecutive buy
ASPEN PHARMACARE HOLDINGS LIMITED	APN	Buy	02-Dec-08	number of deals
STEINHOFF INTERNATIONAL HOLDINGS LTD	SHF	Buy	30-Jun-06	deal value
STEINHOFF INTERNATIONAL HOLDINGS LTD	SHF	Sell	15-Nov-06	deal value
STEINHOFF INTERNATIONAL HOLDINGS LTD	SHF	Buy	29-Oct-07	deal value
TRUWORTHS INTERNATIONAL LIMITED	TRU	Buy	07-Nov-02	deal value
TRUWORTHS INTERNATIONAL LIMITED	TRU	Sell	01-Jun-05	5th consecutive sell
TRUWORTHS INTERNATIONAL LIMITED	TRU	Buy	19-Mar-09	deal value
TRUWORTHS INTERNATIONAL LIMITED	TRU	Sell	20-Apr-09	deal value
AFRICAN BANK INVESTMENTS LTD	ABL	Buy	06-Jun-05	deal value
AFRICAN BANK INVESTMENTS LTD	ABL	Sell	29-Mar-06	deal value
AFRICAN BANK INVESTMENTS LTD	ABL	Buy	14-Jun-07	deal value
AFRICAN BANK INVESTMENTS LTD	ABL	Sell	23-Jul-07	deal value
AFRICAN BANK INVESTMENTS LTD	ABL	Buy	21-Dec-07	deal value
IMPERIAL HOLDINGS LIMITED	IPL	Buy	10-Nov-05	deal value
IMPERIAL HOLDINGS LIMITED	IPL	Sell	08-Nov-06	deal value
IMPERIAL HOLDINGS LIMITED	IPL	Buy	18-Jun-07	number of deals & deal value
IMPERIAL HOLDINGS LIMITED	IPL	Sell	08-Oct-07	deal value
IMPERIAL HOLDINGS LIMITED	IPL	Buy	01-Sep-08	number of deals & deal value
IMPERIAL HOLDINGS LIMITED	IPL	Sell	02-Oct-08	deal value
IMPERIAL HOLDINGS LIMITED	IPL	Buy	03-Nov-08	3rd consecutive buy
MASSMART HOLDINGS LIMITED	MSM	Buy	28-Nov-07	deal value
MASSMART HOLDINGS LIMITED	MSM	Sell	25-Aug-08	deal value
GROWTHPOINT PROPERTIES LIMITED	GRT	Buy	30-Aug-06	3rd consecutive buy
GROWTHPOINT PROPERTIES LIMITED	GRT	Sell	01-Nov-07	number of deals & deal value
GROWTHPOINT PROPERTIES LIMITED	GRT	Buy	28-Feb-08	deal value

All companies that were still in buy status on 30 Jun 09, were automatically sold out at the price on that day in order to arrive at a final Outsider Portfolio valuation. It can be seen that 10 out of the 15 companies only trigger 'buy' signals once over the entire period and only 2, African Bank and Imperial holdings, triggered more than twice in the study period. This is a somewhat disappointing finding as one would hope that directors had more faith in the success of their businesses based on their good management practices. This could allude to an agency problem in South African business, and could form

the basis of an interesting research report in future. However, this could also be attributed to the trigger limits having been too restrictive to really identify 'positive' trading behaviours.

4.2.3. Portfolios

These triggers were then used in the construction of an Outsider Portfolio as described in Chapter 3 above and the returns to this portfolio were calculated. The portfolio assumed an initial investment amount available of R100,000. For the same period, the cash only and market-index only portfolios were constructed, investing R100,000 at the beginning of the period and closing out the portfolio at the end.

The performances of these portfolios are illustrated graphically in the figure below.

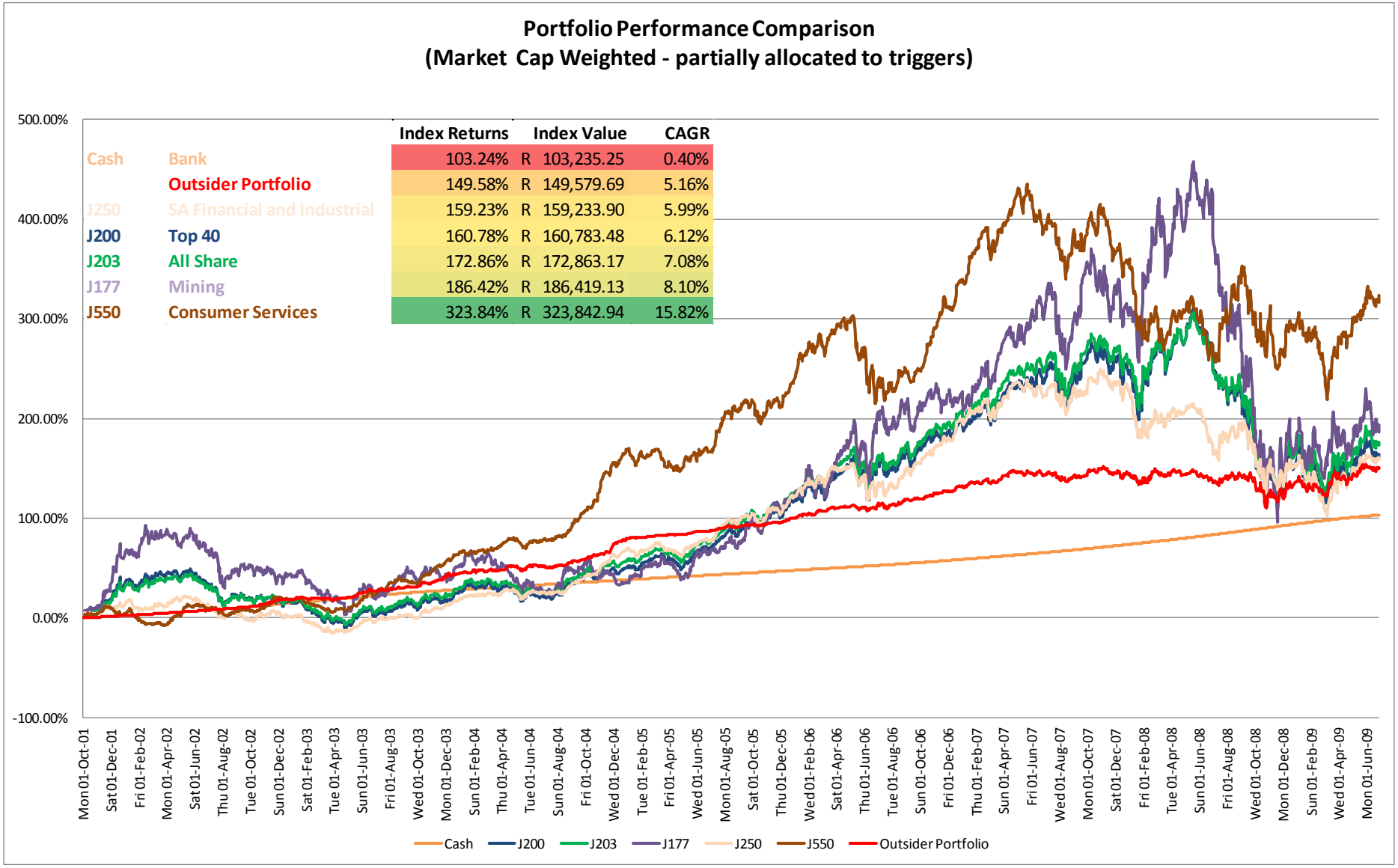


Figure 1: Portfolio Performance Comparison (Market Cap Weighted – partially allocated using a factor of 5 times the market cap weighting)

The results show that across the period, the Outsider Portfolio does not perform exceptionally and in fact underperforms all of the indices selected. It can also be seen that using this approach, an investment in the J550 more than doubles the performance of the Outsider Portfolio.

However, the proposed methodology did not initially anticipate the value of investment in each identified trigger other than to state it should be market cap weighted. Thus, in order to calculate the value of the investment required per trigger, the above strategy assumed the market cap weight (to the total market cap of the top 40) of the triggered share, multiplied by a factor of 5, as a percentage of the R100,000 initial investment (i.e. fixed price investment on each trigger event). This factor of 5 was initially arbitrarily decided upon, based on the fact that the most heavily weighted share triggered (MTN) equated to only 7.6% market cap weighting to the Top 40, resulting in an investment of only 7.6%X5 =R38,000 of the initial R100,000 available. Also, as only 15 companies in the Top 40 (less than half) delivered triggers, and many of the companies that triggered had market cap weightings of well below 1%, it was decided that 5 times that weighting would probably not put the portfolio into a negative cash situation, which proved to be true. Any excess was invested in cash at Prime minus 4%.

It was noticed though, that on average, less than 50% of the initial available investment of R100,000 was invested in the Outsider Portfolio at its peak, and the balance remained in cash, which meant half of the portfolio was simply earning interest and could not be expected to ‘outperform’ the indices. As such a second portfolio using a factor of 10 times the market cap weighting was used to see the effect of higher investment in the ‘shares of interest’ or triggered share, and the results are charted in Figure 2 below were achieved.

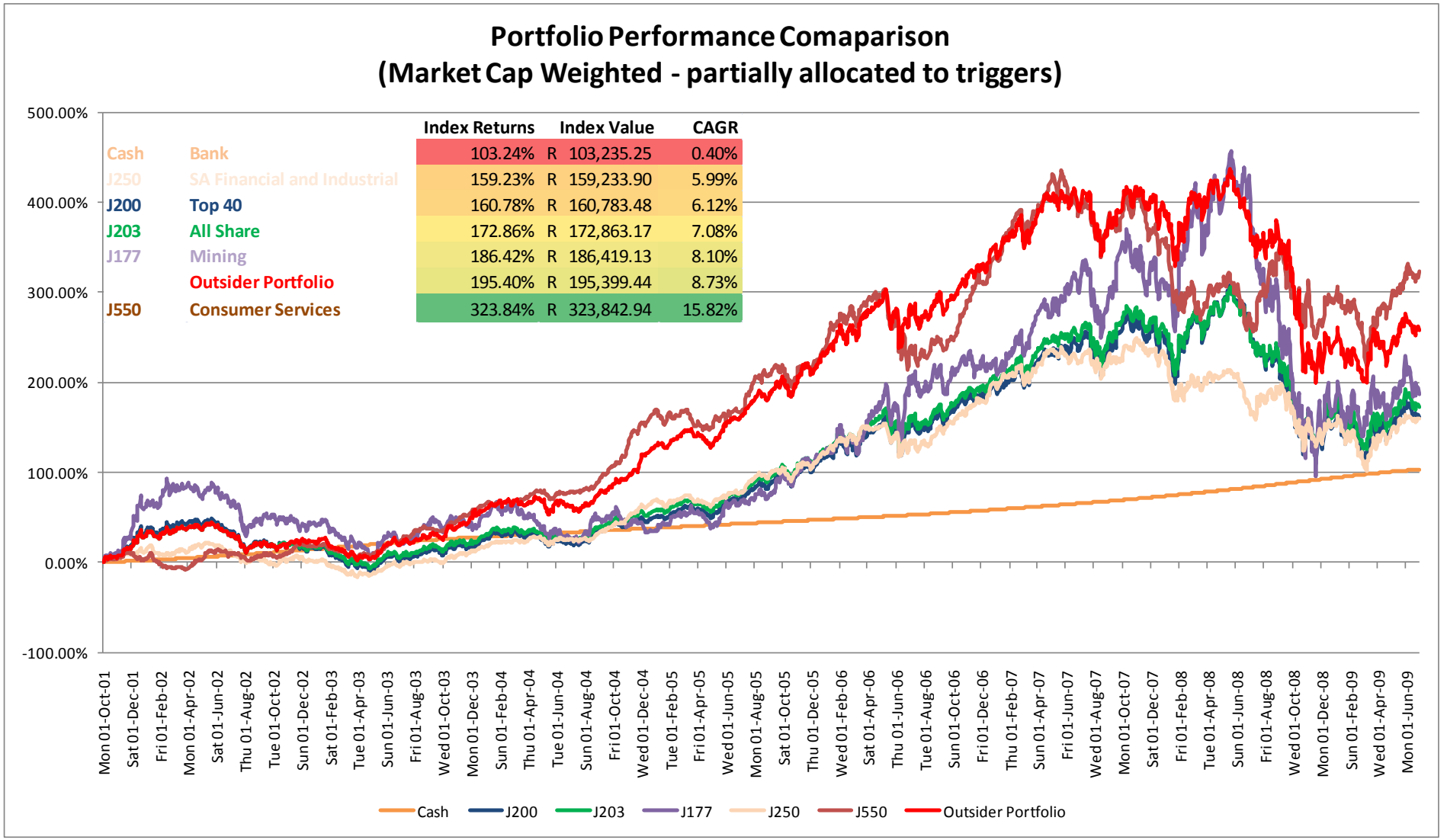


Figure 2: Portfolio Performance Comparison (Market Cap Weighted – partially allocated using a factor of 10 times the market cap weighting)

The results above show a better overall performance of the Outsider Portfolio using a factor of 10 times the market cap weighting to determine the investment values. This is due to a much greater proportion of the available investment (R100,00) being invested in the shares of interest. There was a risk that this may have resulted in negative cash values in the portfolio, but as it turned out this was not the case over the period of study. This limitation was however reached once moving up towards a factor of 12 times the market cap weighting and thus for the fixed investment strategy, the limit was set at 10. As can be seen above, the performance of the Outsider Portfolio visibly improved, but was still significantly outperformed by the J550. This was again a disappointing result as the hypothesis was that directors have greater knowledge about the workings of their businesses and should profit from this knowledge through well timed trades.

The increased performance due to the increased value invested in shares of interest led to a new hypothesis that the more invested in these shares (and thus the less in cash), the better the performance that may be achieved in support of a positive response to the research question. As such one final strategy was modelled. This strategy invested all funds available in the Outsider Portfolio exclusively into the shares of interest, and leaving none (or very little) in cash. That is, on each trigger, regardless of whether it consisted of a buy or a sell signal, the entire outsider share portfolio was rebalanced to allocate all portfolio funds across the buy status companies at the time, in proportion to their market capitalisation. If there was a period in which no shares were in buy status, then the full investment available remained in cash. This only happened in the early stages of the study period prior to the receipt of the first trigger. As can be seen in Figure 3 below, using this strategy the Outsider Portfolio outperforms all of the market-index portfolios, confirming the hypothesis. That is, when full faith is placed into the efficacy of directors' dealings and all available funds are invested into shares in buy status based on the trading strategy defined, that the maximum return would be achieved. This result indicated a resounding positive response to the research question, confirming that outside investors can indeed earn abnormal excess returns by purchasing

a share after intensive directors' purchase activity, and selling the share after intensive directors' sales activity.

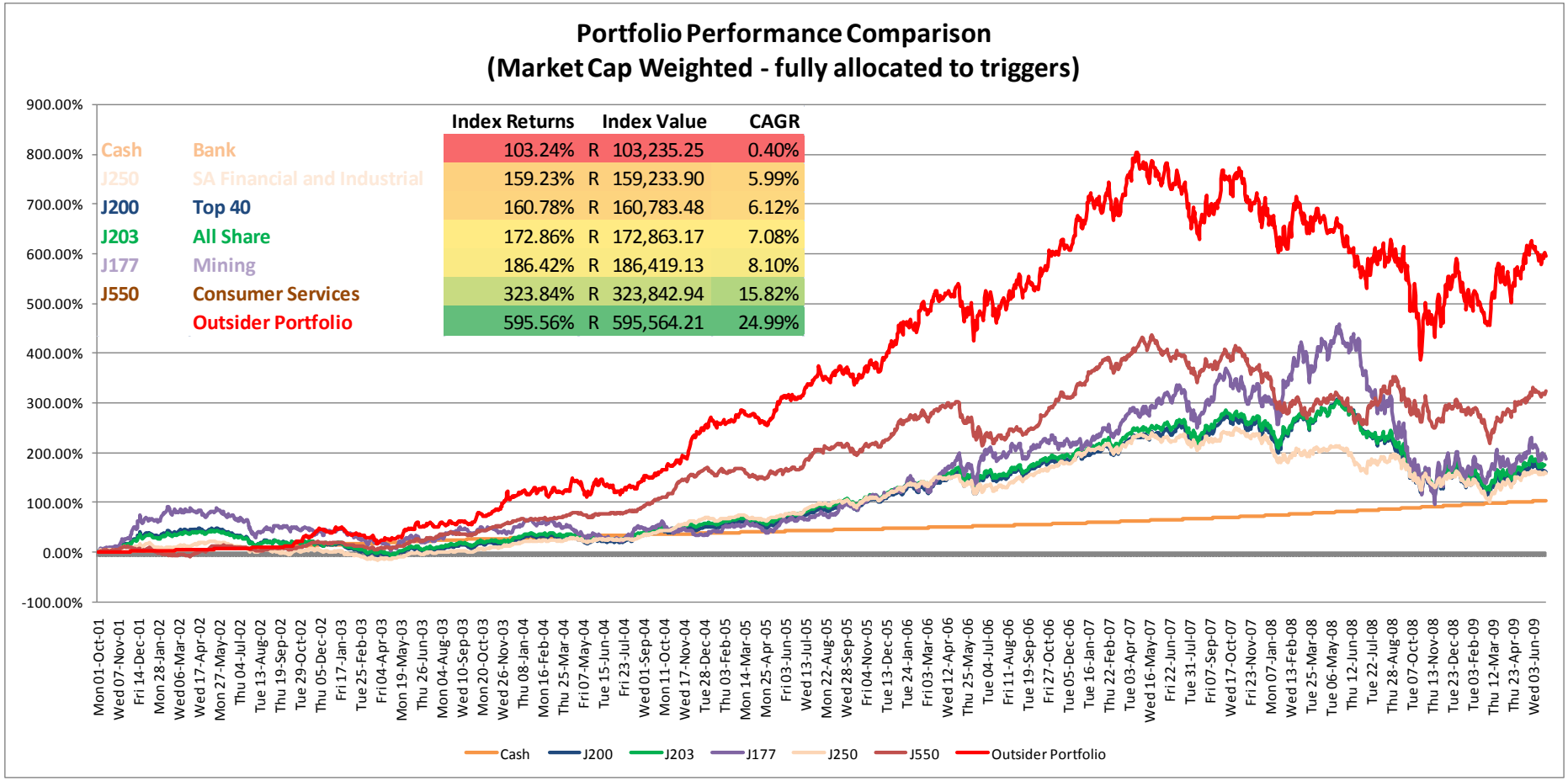


Figure 3: Portfolio Performance Comparison (Market Cap Weighted – fully allocated)

The two tables below summarise the returns achieved at the end of the study period using the three different investment value strategies described above.

Table 2: Returns using different investment value strategies

Outsider Portolio Returns		
Market Cap Weight * Factor of 5	Market Cap Weight * Factor of 10	100% Market Cap Weight
149.58%	195.40%	595.56%

The table compares the returns from the 3 different strategies pertaining to the decision on how much to invest in each of the triggered shares. The first column in the table assumed the market cap weight multiplied by a factor of 5. The second column assumed the market cap weight multiplied by a factor of 10 and yielded much improved returns to the Outsider. The last column assumed that the full available portfolio value should be invested 100% in shares of interest, using a ratio of market cap weights as a split across those shares in buy status. The colours across the table grade the portfolio returns from worst (red) to best performing (green). As can be seen, the results showed a continual improvement in performance of the Outsider Portfolio as the portion of the portfolio invested in triggers increased in relation to the portion invested in cash. The final Outsider Portfolio strategy of 100% investment in triggers only, way outperformed the straight-up cash portfolio, as well as all of the selected indices. A total return of 595.56% equates to an annual compounded return of 24.99% over the study period which is a respectable return by trading standards. For this reason, the 3rd strategy of 100% market cap weighted, or full investment into shares of interest, was adopted as the preferred method for investment across the study period.

4.2.4. Monte Carlo Simulation

From the previous analysis it seemed that outsiders could indeed earn handsome abnormal excess returns by purchasing a share after intensive directors' purchase activity, and selling the share after intensive directors' sales

activity But was this performance a once off chance event? How likely would any other random portfolio approximate this return?

The following Monte Carlo Simulation addresses these questions. In order to test whether or not this return of 595% on the Outsider Portfolio was due to luck, chance or randomness, 20,000 random portfolios were generated along the same principals as the Outsider Portfolio. These principals are explained in the next paragraphs.

The Outsider Portfolio trading strategy produced triggers from 15 of the Top 40 companies on the JSE over the study period. As such, the 'random portfolios' were also restricted to 15 shares in each. These 15 shares were randomly selected from the Top 40 for each portfolio using the MS Excel Rand() function.

The mean, median and standard deviation for "days between buy and sell trades" on the Outsider Portfolio were as follows:

Table 3: Statistics on Outsider Portfolio for "days between trades"

Mean days	Median Days	Std Dev days
471	329	517

As such, for each of the 15 random shares selected per portfolio, a random set of buy and sell trades (or triggers) were generated to approximate these metrics on the Outsider Portfolio, also using the MS Excel Rand() function i.e. the mean, median and standard deviation for "days between buy and sell trades" on the random portfolios trended around those of the Outsider Portfolio.

The same metrics calculated across an initial set of randomly generated portfolio triggers returned the following:

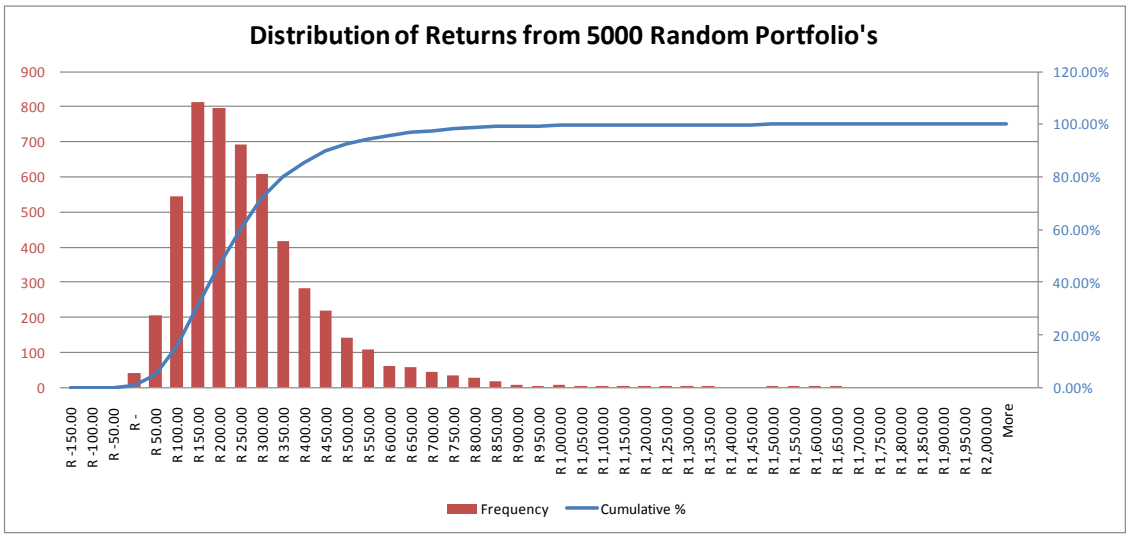
Table 4: Statistics on random portfolios for "days between trades"

Mean days	Median days	Std Dev Days
460	311	503

This illustrates that the randomly generated portfolios exhibit similar metrics to the Outsider Portfolio in terms of mean, median and standard deviation for “days between buy and sell trades”.

The performance of each randomly generated portfolio of 15 random shares, each with randomly generated buy and sell triggers was then calculated.

The results of 5,000 random portfolio returns are charted below:

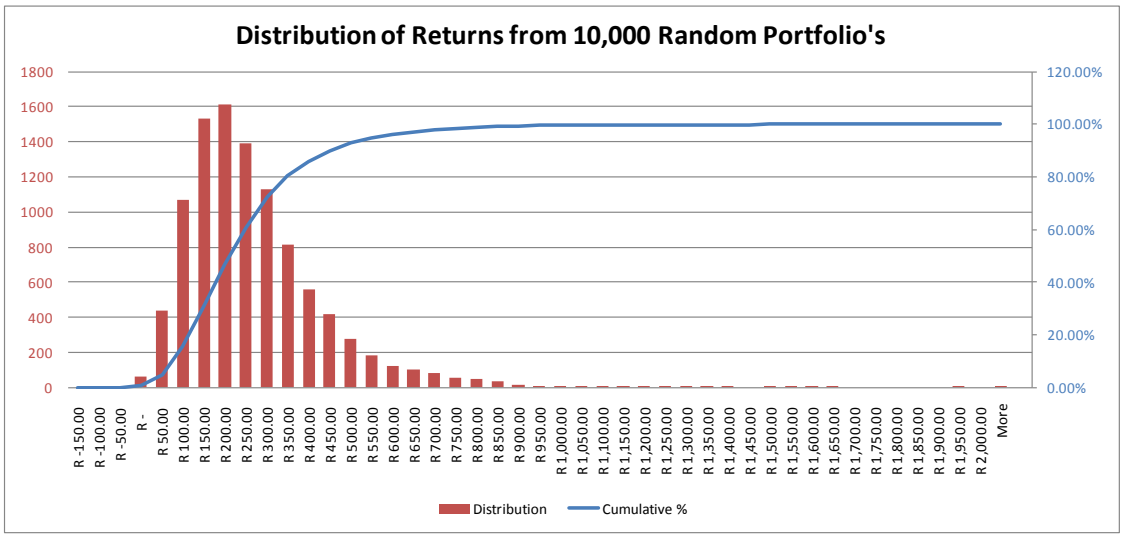


PERFORMANCE	
Mean	243.9817188
Standard Error	2.398252385
Median	207.2209467
Mode	#N/A
Standard Deviation	169.5820524
Sample Variance	28758.0725
Kurtosis	6.286786623
Skewness	1.833609021
Range	1746.067613
Minimum	-41.3495712
Maximum	1704.718042
Sum	1219908.594
Count	5000
Largest(1)	1704.718042
Smallest(1)	-41.3495712
Confidence Level(95.0%)	4.70162653

Figure 4: Monte Carlo Simulation of 5,000 random portfolios

The Outsider Portfolio return of 595.43% ranked at the 96.1 percentile against these 5,000 random portfolio returns. This was considered to be further strong support for a positive answer to the research question. That is the Outsider Portfolio outperformed the random portfolios.96 times out of 100

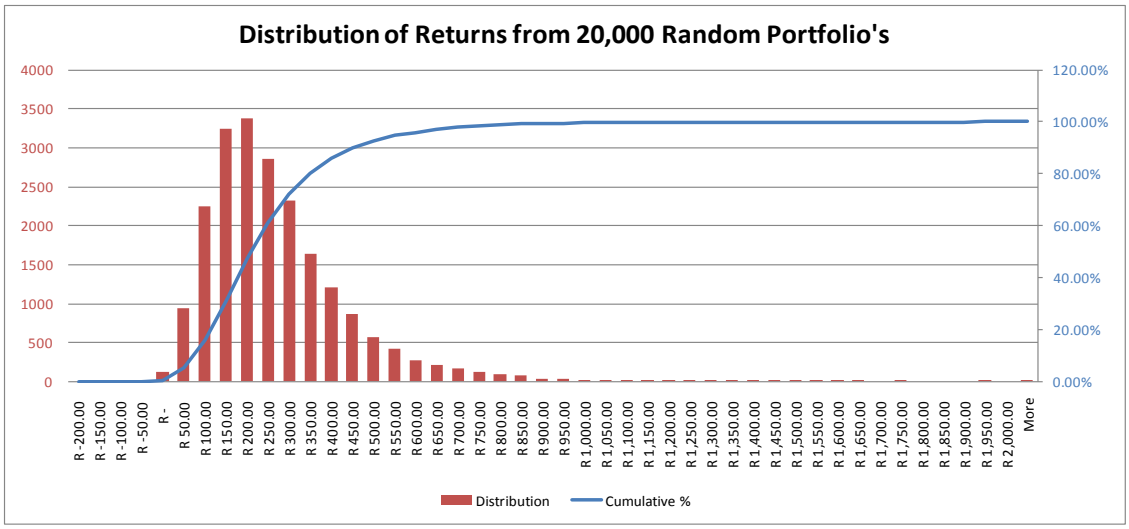
A further 5,000 random portfolio returns were calculated (10,000 in total) with results charted below:



PERFORMANCE	
Mean	244.8527311
Standard Error	1.696771895
Median	209.2313632
Mode	#N/A
Standard Deviation	169.8383063
Sample Variance	28845.05029
Kurtosis	11.18678959
Skewness	2.133206872
Range	2749.508347
Minimum	-47.8477399
Maximum	2701.660608
Sum	2453179.512
Count	10019
Largest(1)	2701.660608
Smallest(1)	-47.8477399
Confidence Level(95.0%)	3.326013555

Figure 5: Monte Carlo Simulation of 10,000 random portfolios

The mean of the 10,000 random Portfolio returns moved less than 1% with the median moving only 2%. This is insignificant when the mean is sitting at 244% return and thus indicated that the 5000 sample was probably enough random portfolios from which to draw conclusions. However, the Outsider Portfolio ranked at the 95.8 percentile against 10,000 random portfolio returns. This dropped slightly from the 5,000 sample and as such the research continued to 20,000 random portfolios to ensure the result was not further impacted. The results for the 20,000 random portfolios are charted below:



PERFORMANCE	
Mean	245.2160618
Standard Error	1.181292867
Median	208.7007293
Mode	#N/A
Standard Deviation	170.9367924
Sample Variance	29219.38699
Kurtosis	9.118297019
Skewness	2.033631745
Range	2749.508347
Minimum	-47.8477399
Maximum	2701.660608
Sum	5134579.117
Count	20939
Largest(1)	2701.660608
Smallest(1)	-47.8477399
Confidence Level(95.0%)	2.315425257

Figure 6: Monte Carlo Simulation of 20,000 random portfolios

There were very minor differences between the descriptive statistics of 10,000 and 20,000 random portfolio returns. The mean of the portfolio returns shifted by less than 0.25% against a mean of 245.22% and the median less than 0.5% against a median of 208.70%.

The Outsider Portfolio ranked at the 95.8 percentile against 20,000 random portfolio returns which was no different to the 10,000 sample. As such it was concluded that a 20,000 sample Monte Carlo simulation was a satisfactory simulation from which to draw conclusions.

At this percentile, the Outsider Portfolio lies further than 2 standard deviations from the mean indicating a very favourable response to the research question posed and it was hypothesised that this return was no chance or opportunistic return, but rather that there was information in directors trades from which an outsider could profit. However, this could be affirmed until such time as the return structure was investigated which is described in the next section.

4.2.5. Return Structure

From all of the evidence above it appears that the answer to the research question is a resounding ‘yes’. However, closer inspection of the structure, or contribution of each triggered share to the total Outsider Portfolio return, calls this into question.

The table and chart below show the individual returns contributed by the triggered shares to the total Outsider Portfolio returns.

Table 5: Individual share contributions to the Outsider Portfolio

Code	Share Name	Contribution
NPN	Nampak	R 214,885.24
REM	Remgro	R 82,557.82
ASA	Absa	R 69,295.01
NED	Nedbank	R 63,123.33
ARI	African Rainbow Minerals	R 41,528.00
MTN	MTN	R 40,817.15
ANG	Anglo	R 40,168.10
ABL	Abil	R 37,606.95
PIK	Pick 'n Pay	R 27,989.54
GRT	Growthpoint	R 23,485.21
AMS	Anglo Plats	R 12,857.38
APN	Aspen	R 10,002.94
RMH	RMB Holdings	R -938.39
DSY	Discovery	R -3,476.37
SBK	Standard Bank	R -76,354.82

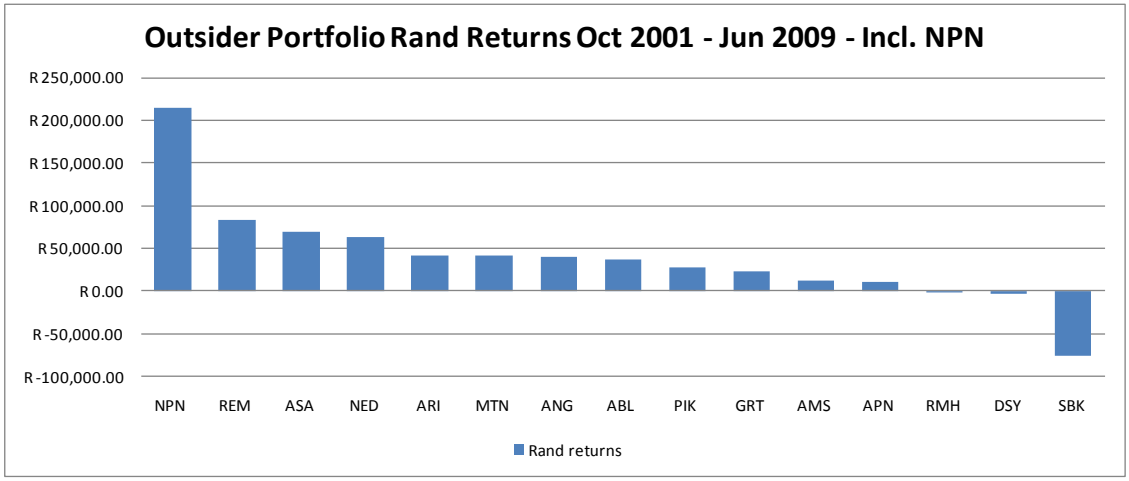


Figure 7: Individual share contributions to Outsider Portfolio returns

It appears that nearly one third of the Outsider Portfolio's return was contributed by only one share, that being Naspers (NPN). Of the total R595,564 return

achieved by the Outsider Portfolio, R214,885.24 or 36% resulted from the investment in Naspers only. This posed the question “would it be wise to build a trading strategy based on results where one share contributes such a large proportion of the return?” The returns of the other 14 shares seem to be mediocre at best with 3 of the 15 (20%) even showing a negative return. If there was any merit in the triggers identified, one would have expected to have seen all of the shares contributing, and contributing more equitably to the total.

If one looks more closely, it can be seen that if one ignored the triggers and just looked at the market return for each share over the period (i.e. invested permanently in each share as per the indices), that Naspers also showed the greatest overall return of all of the 15 triggered shares.

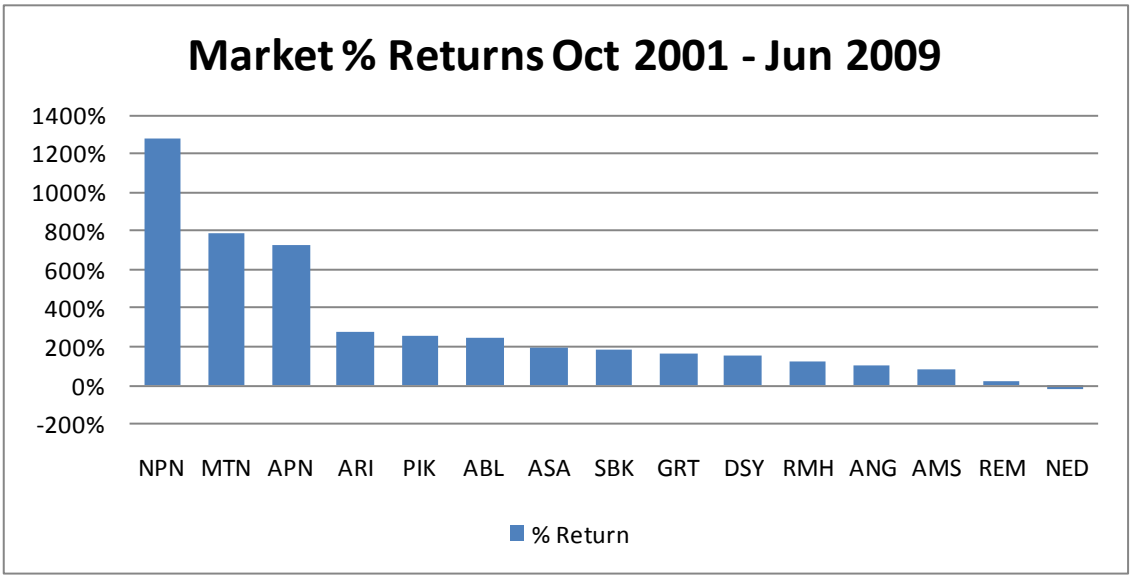


Figure 8: Individual share performance over the study period

In fact, if one had invested the full R100,000 investment into Naspers on 1 Oct 2001 (6802 shares at R14.70 per share) and sold on 30 Jun 2009 (6802 shares at R20.30 per share), the return would have amounted to and astounding R1,280,816.60. However, the next two shares in line, MTN and Anglo Platinum, hardly performed in the Outsider Portfolio, contributing R 40,817.1 5 and R 10,002.94 respectively. So it is clear, that the signals identified did not pick out the high performing shares (other than Naspers). In fact, Remgro, the second worst performing share of the triggered shares over the period, was the second largest contributor to the Outsider Portfolio with a contribution of R 82,557.82.

So should the trigger in Naspers be considered to have been ‘lucky’ or ‘opportunistic’ and be excluded from the study as an outlier?

Taking the market return to Naspers over the period and looking at it on a year on year basis, one finds that Naspers was very strong through the 2003/2004 period (see chart below).

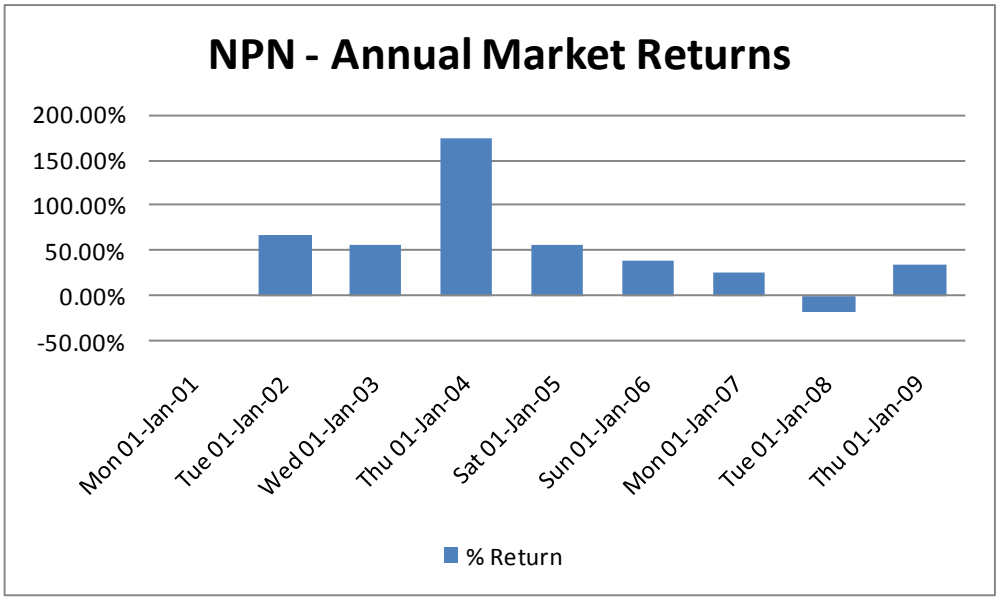


Figure 9: Naspers annual share performance over the study period

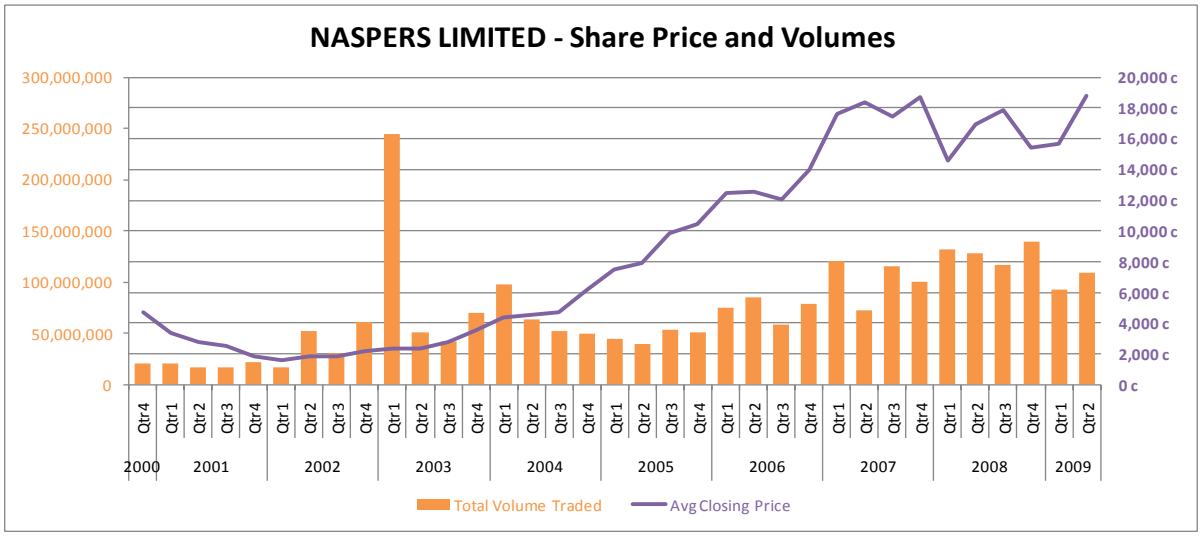
In fact, the Naspers share triggered to buy on 15-Oct-02 and to sell on 31-Dec-04 which coincides perfectly with the period of high performance as one would ‘expect’ from a trigger. From the graph above it could be argued that the directors had information and traded accordingly, triggering the strategy to be ‘in’ the share during the most lucrative period of Naspers returns. To look at the Naspers triggers more closely the Naspers exhibit from Appendix A is reproduced below. The following key to graph indicators should be noted:

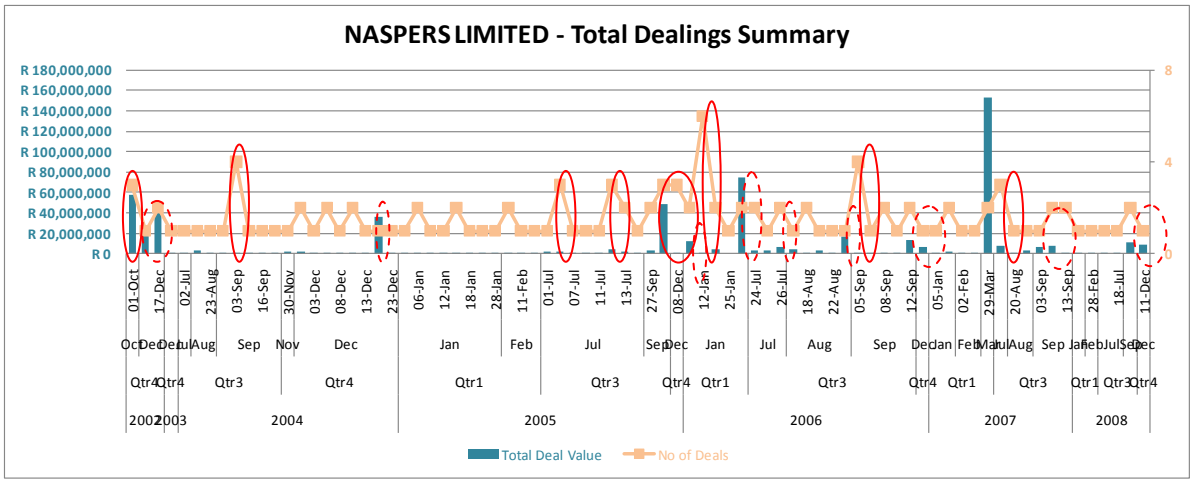
KEY to Graph Indicators

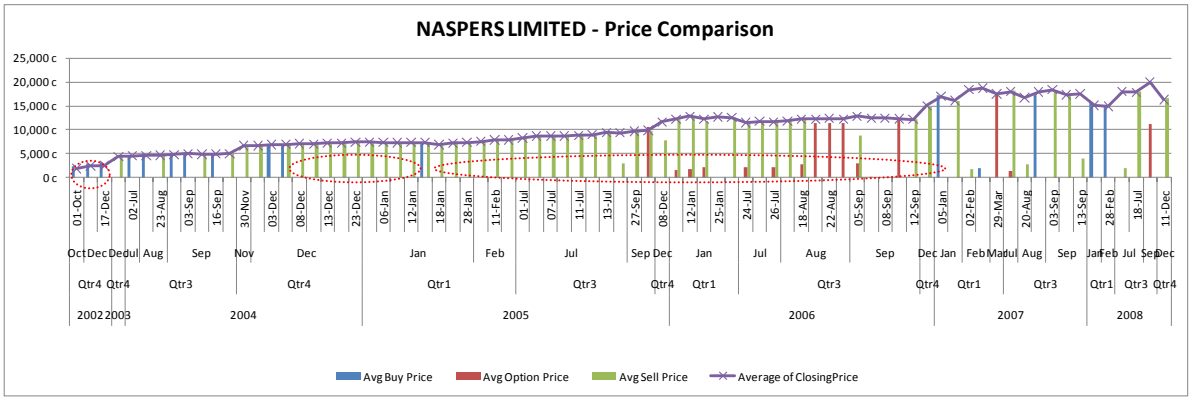
- Potential trigger for ‘number of deals’ signal
- Potential trigger for ‘deal value’ signal
- Potential trigger for ‘consecutive deals’ signal

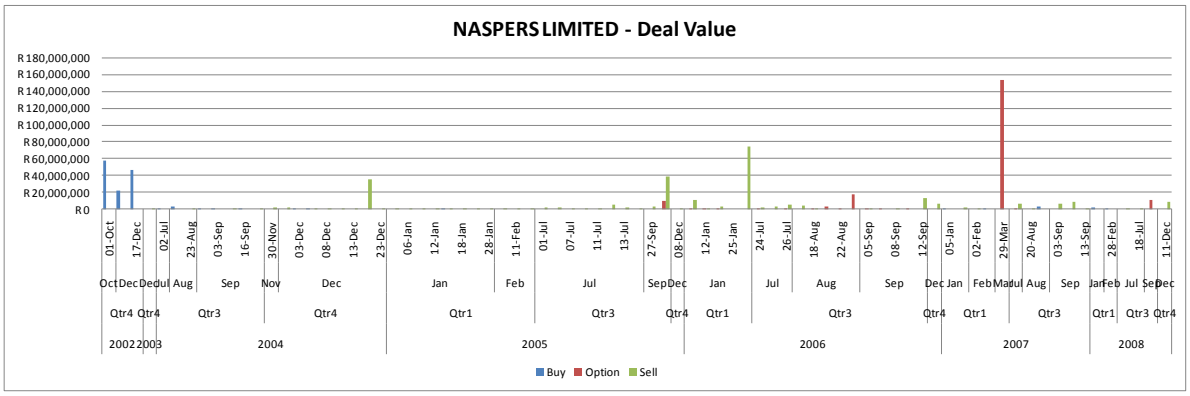
Table 6: Naspers exhibit from Appendix A

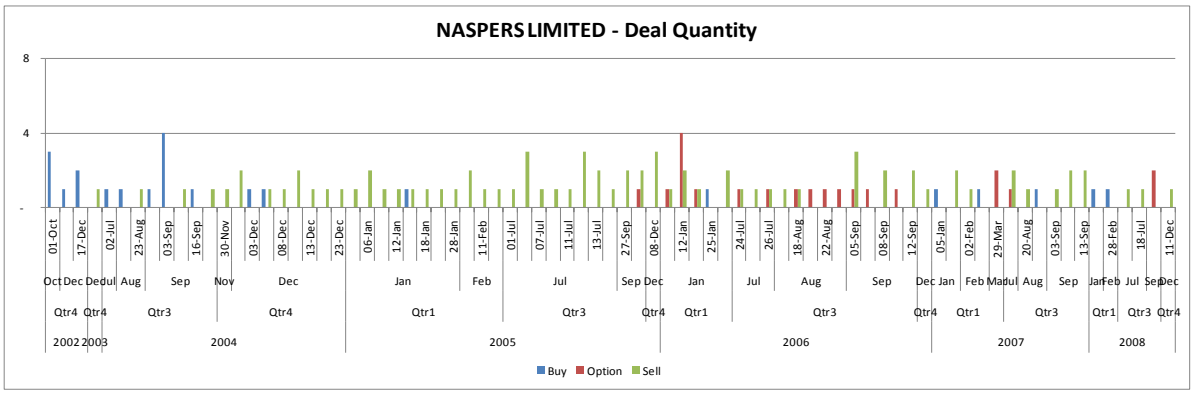
Rank: 12, Market Cap as at 30 June 2009: R82,074 million











The 1-Oct-2002 triggers both the 'deal value' and the 'number of deals' signals, with 1 director doing three deals to buy shares at or near to the market price to a cumulative value of R57,4 million. This deal is followed by buy deals on a further two consecutive dates triggering the 'consecutive buy deal' signal as well, further strengthening the signal.

Company	ShareCode	DirectorName	DirectorPosition	Qty	DealType	Price	FullDate	DealValue
NASPERS LIMITED	NPN	Bekker JP	Managing Director	817470	Buy	2239	01-Oct-02	R 18,303,153
NASPERS LIMITED	NPN	Bekker JP	Managing Director	817470	Buy	2335	01-Oct-02	R 19,087,925
NASPERS LIMITED	NPN	Bekker JP	Managing Director	817470	Buy	2450	01-Oct-02	R 20,028,015
NASPERS LIMITED	NPN	Bekker JP	Managing Director	745427	Buy	2909	12-Dec-02	R 21,684,471
NASPERS LIMITED	NPN	Bekker JP	Managing Director	745427	Buy	3037	17-Dec-02	R 22,638,618
NASPERS LIMITED	NPN	Bekker JP	Managing Director	745427	Buy	3154	17-Dec-02	R 23,510,768

The 3-Sep-2004 further reinforces this signal when 4 more directors buy shares at or near to the market price worth a cumulative R1,4 million, triggering the 'deal quantity' signal.

Company	ShareCode	DirectorName	DirectorPosition	Qty	DealType	Price	FullDate	DealValue
NASPERS LIMITED	NPN	Coetzee G		20000	Buy	5045	03-Sep-04	R 1,009,000
NASPERS LIMITED	NPN	Groepe F		3964	Buy	5045	03-Sep-04	R 199,984
NASPERS LIMITED	NPN	Van Heerden NP	Independent Non-Executive Director	500	Buy	5045	03-Sep-04	R 25,225
NASPERS LIMITED	NPN	Malherbe		5054	Buy	5045	03-Sep-04	R 254,974

On 17-Dec-2004, 1 director sells shares worth R35.9 million at or near the market price triggering the 'deal value' signal to sell. On 23-Dec-2004, a 5th

consecutive sell deal is transacted, further re-enforcing the sell signal of the 17-Dec-2010.

Company	ShareCode	DirectorName	DirectorPosition	Qty	DealType	Price	FullDate	DealValue
NASPERS LIMITED	NPN	Du Plessis F-A	Independent Non-Executive Director	200	Buy	6952	07-Dec-04	R 13,904
NASPERS LIMITED	NPN	de Swardt S		10000	Sell	6909	07-Dec-04	R 690,900
NASPERS LIMITED	NPN	Groepe F		250	Sell	7100	08-Dec-04	R 17,750
NASPERS LIMITED	NPN	Vosloo T	Independent Non-Executive Chairman	5000	Sell	7029	09-Dec-04	R 351,450
NASPERS LIMITED	NPN	Vosloo T	Independent Non-Executive Chairman	10000	Sell	6849	09-Dec-04	R 684,900
NASPERS LIMITED	NPN	Vosloo T	Independent Non-Executive Chairman	7549	Sell	7199	13-Dec-04	R 543,453
NASPERS LIMITED	NPN	Stofberg JDT		500000	Sell	7186	17-Dec-04	R 35,930,000
NASPERS LIMITED	NPN	Vosloo T	Independent Non-Executive Chairman	5000	Sell	7373	23-Dec-04	R 368,650

This sell status remains right through until the end of the period under study with all dates of interest being sell based dates.

Naspers Exhibit ends

If this hypothesis has any merit (that the triggers should coincide with market strength in that share), then one should see similar patterns with other shares that triggered.

MTN was the next most lucrative share to Naspers over the study period.

Taking the market return to MTN over the period and looking at it on a year on year basis, one finds the following:

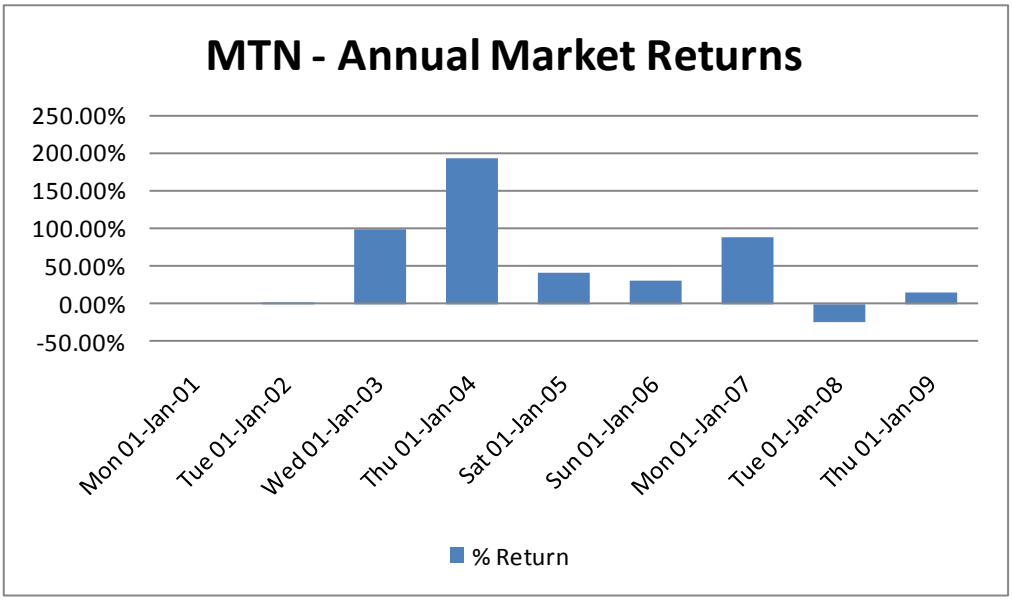
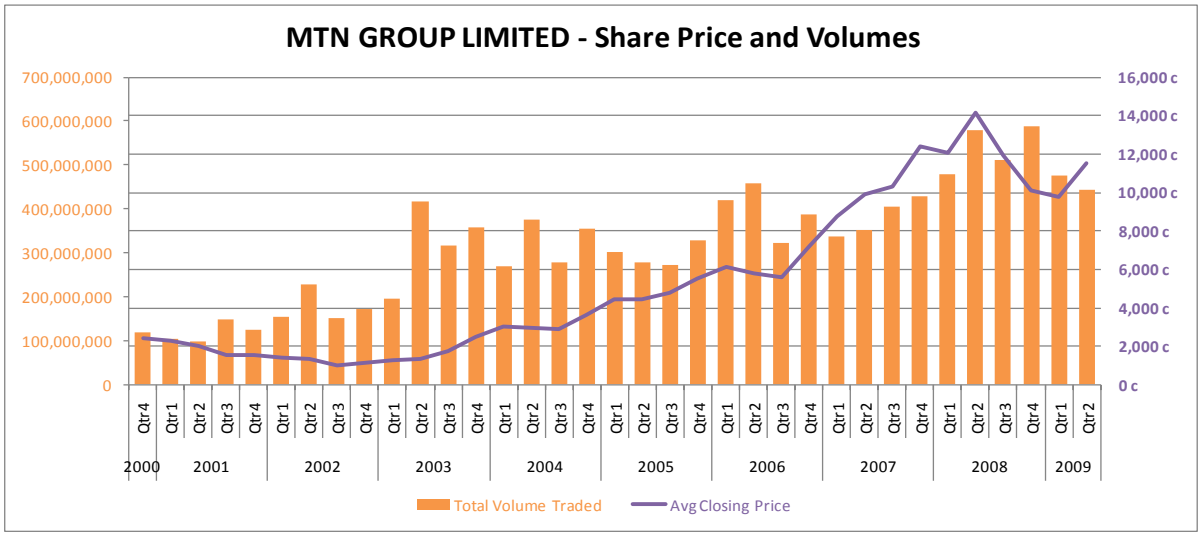


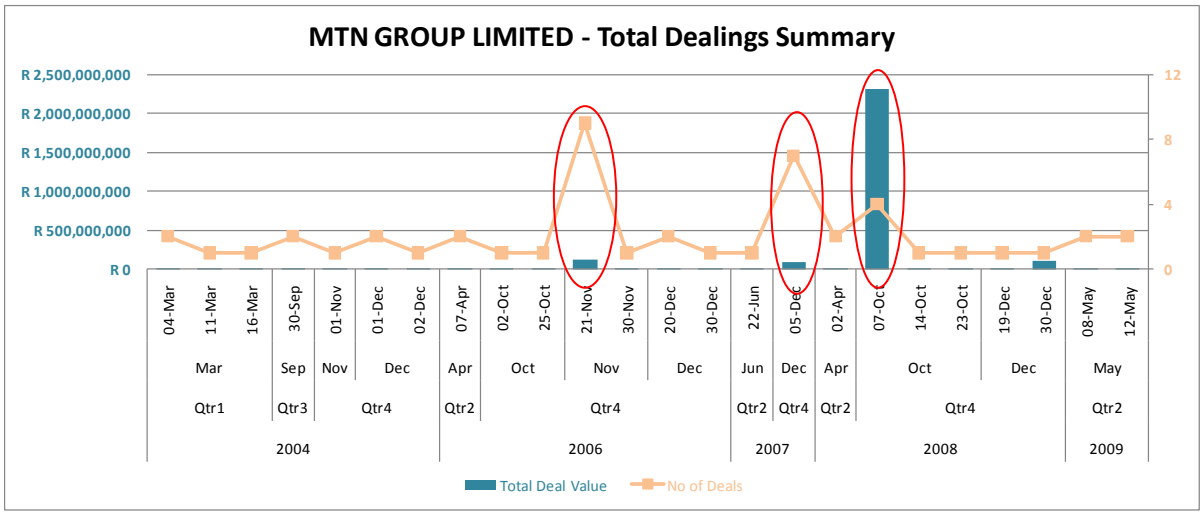
Figure 10: MTN annual share performance over the study period

If the signals produced from the Outsider Portfolio strategy do indeed have validity, then one would like to see MTN triggering to be in the market over the 2002-2004 period and perhaps again over the 2006-2007 period. However, MTN only trigger to buy on 21-Oct-2008 and remained in buy status until the end of the study period. To look at the MTN triggers more closely the MTN exhibit from Appendix A is reproduced below:

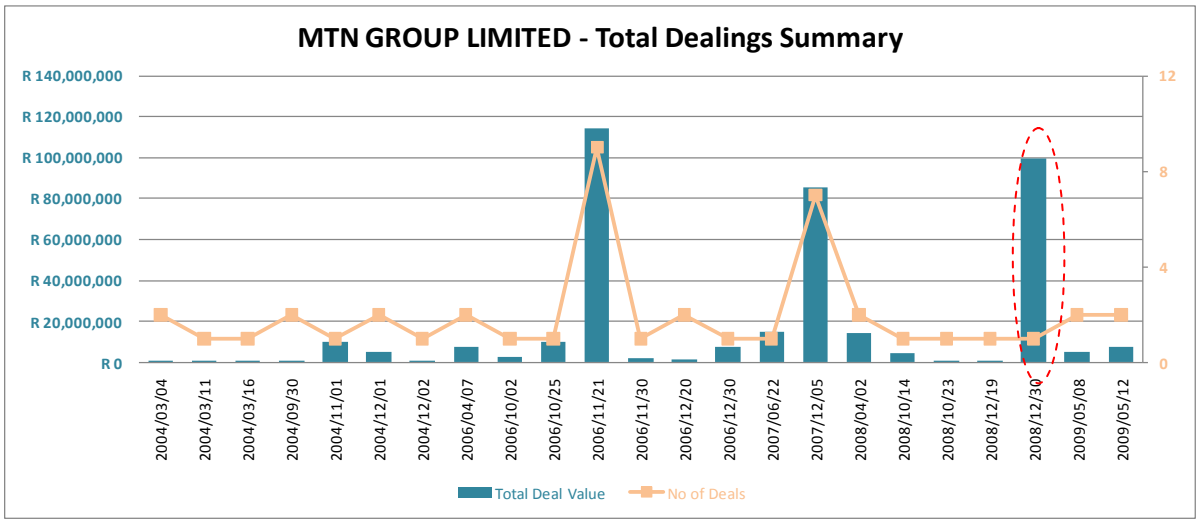
Table 7: MTN exhibit from Appendix A

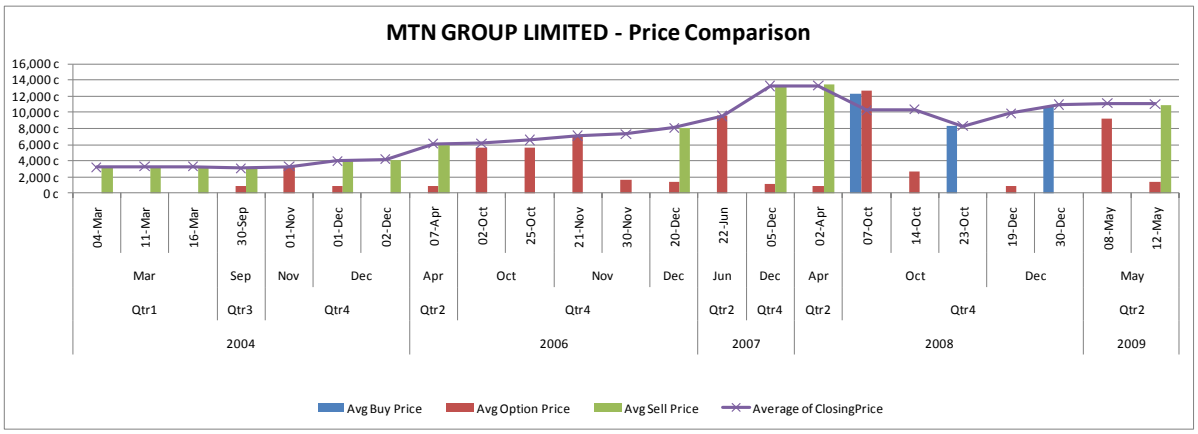
Rank: 4, Market Cap as at 30 June 2009: R217,675 million

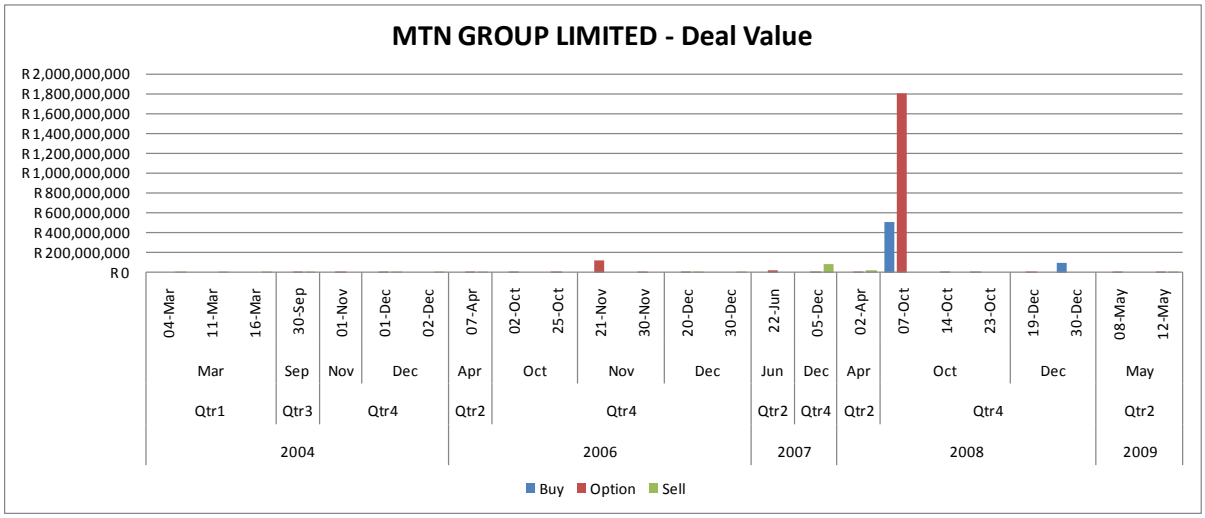




The above indicates three dates of interest, 21-Nov-2006, 05-Dec-2007 and 7-Oct-2008, all three due to the number of deals involved and the third also due to the exceptional value at R2,5 billion. This one large deal could be distorting the balance of the data and has been excluded in the graph below to allow closer investigation. Once excluded, a fourth date shows up as interesting, 3-Dec-2008 due to the value of the deal, even though only 1 director traded.



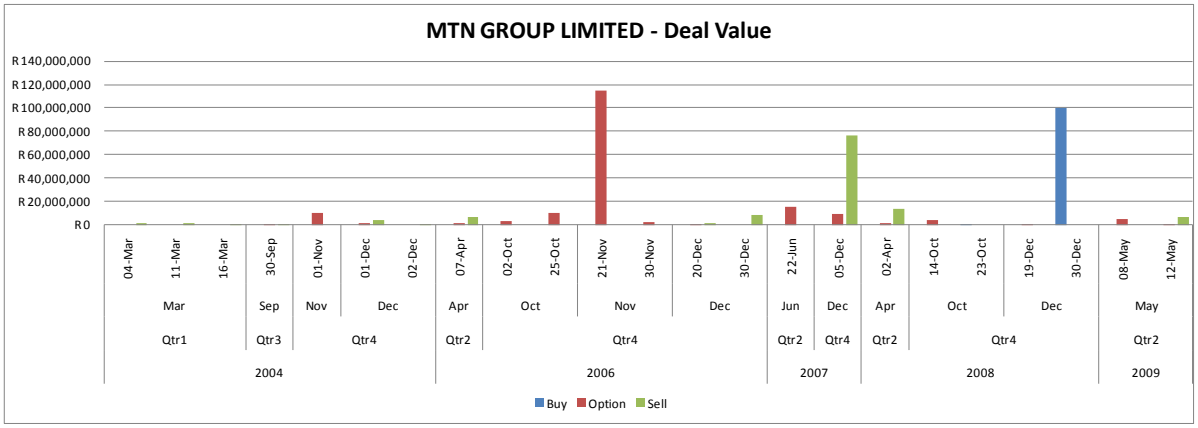


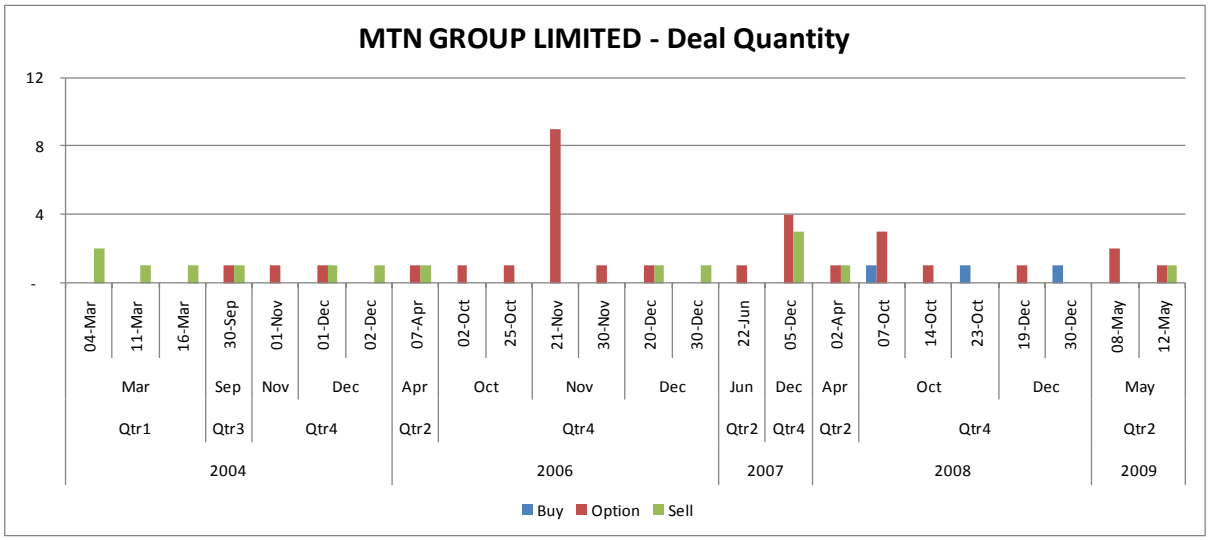


07-Oct-2008 shows the R1,8 billion deal to be options related deal and thus not valid as a signal. However, there was also a buy deal on the same day at or near market price to the value of R500 million, with no sell deals within the next two weeks to negate it, thereby triggering a ‘deal value’ signal to buy.

Company	ShareCode	DirectorName	DirectorPosition	Qty	DealType	Price	FullDate	DealValue
MTN GROUP LIMITED	MTN	Nhleko PF	Group President & Chief Executive Officer	4150000	Option	12909	07-Oct-08	R 535,723,500
MTN GROUP LIMITED	MTN	Nhleko PF	Group President & Chief Executive Officer	4150000	Buy	12234	07-Oct-08	R 507,711,000
MTN GROUP LIMITED	MTN	Nhleko PF	Group President & Chief Executive Officer	5000000	Option	15000	07-Oct-08	R 750,000,000
MTN GROUP LIMITED	MTN	Nhleko PF	Group President & Chief Executive Officer	5000000	Option	10257	07-Oct-08	R 512,850,000

Once again this large deal distorts others and is excluded in the graph below to allow closer investigation of smaller deals.





The above shows that the 21-Nov-2006 and the 5-Dec-2007 were both option related deals and thus disqualifies them both as signals.

On the 30-Dec-2008, however, a further buy deal at or near market price to the value of R100 million by the same director further re-enforces the signal to buy received on 7-Oct-2008.

Company	ShareCode	DirectorName	DirectorPosition	Qty	DealType	Price	FullDate	DealValue
MTN GROUP LIMITED	MTN	Nhleko PF	Group President & Chief Executive Officer	931183	Buy	10712	30-Dec-08	R 99,748,323

MTN Exhibit ends

Another share of interest would be Remgro (REM) which, although it was the second worst performer of the triggered shares as far as market performance was concerned, contributed the second highest value after Naspers to the Outsider Portfolio at R 82,557.82.

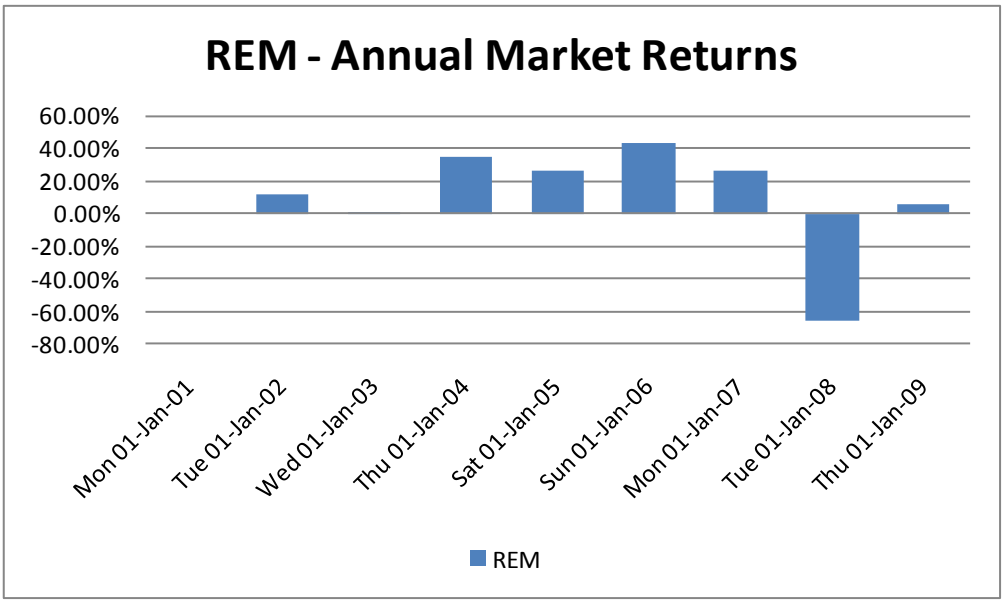
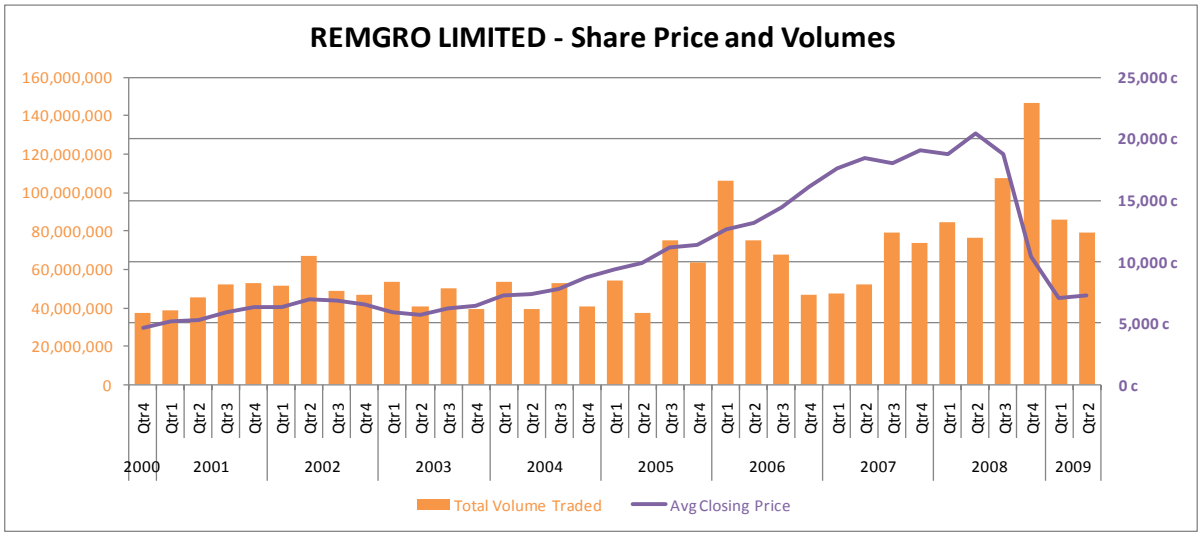


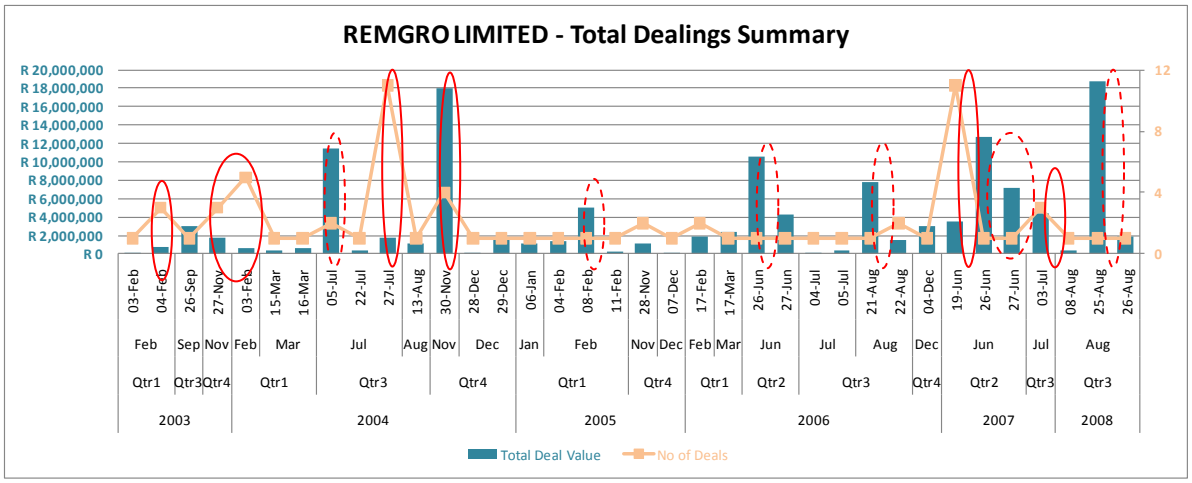
Figure 11: MTN annual share performance over the study period

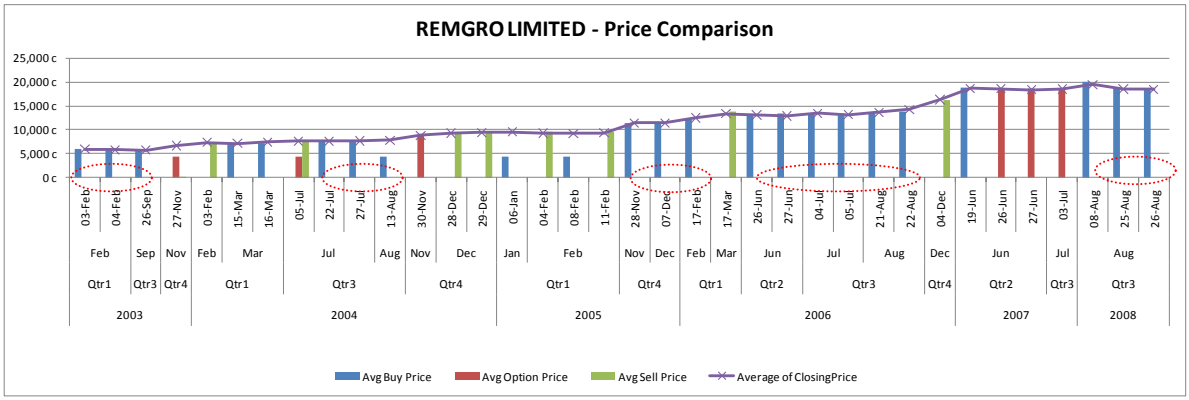
Again, if the Naspers hypothesis has any merit, one would like to see Remgro triggering to be in the market over 2005-2006 period (years of highest return). However, Remgro triggered to buy on 18-Feb-03 and to sell on 17-Feb-04. Then triggered again to buy on 10-Aug-04 and remained in buy status until the end of the study period, including the terrible 2007-2008 period. To look at the Remgro triggers more closely the Remgro exhibit from Appendix A is reproduced below:

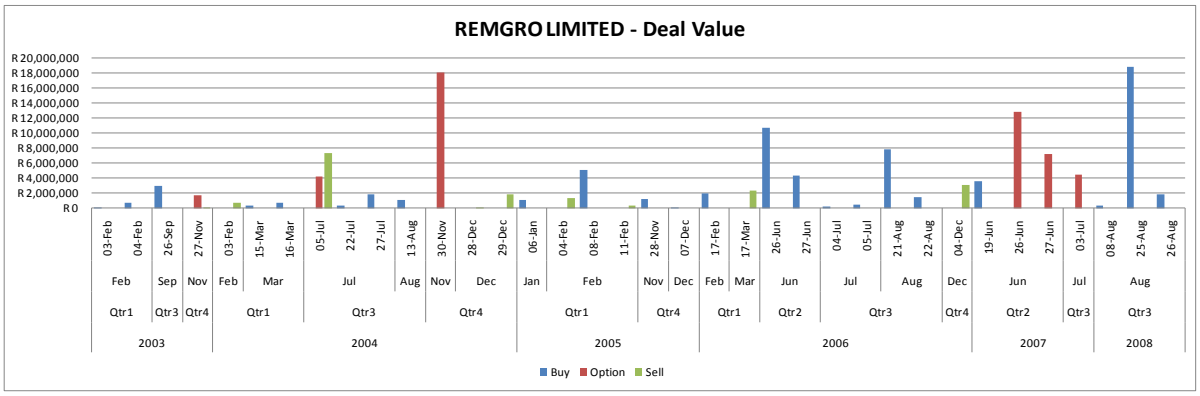
Table 8: Remgro exhibit from Appendix A

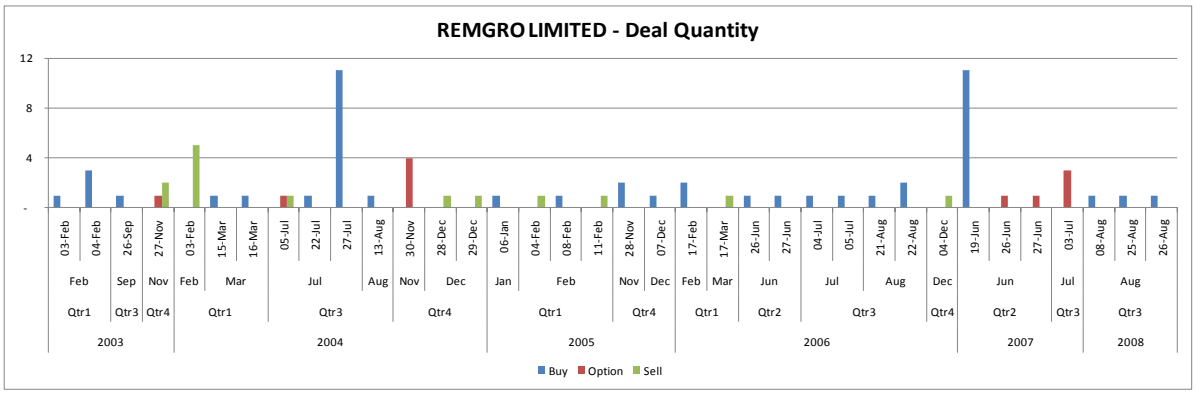
Rank: 22, Market Cap as at 30 June 2009: R32,570 million











On 4-Feb-2003, 1 director transacted three buy deals at or near to market price to the cumulative value of R700 thousand triggering the 'number of deals' signal to buy. The same director had transacted similarly the day before, and this buy status remains through to Sep-2003 when the 3rd 'consecutive buy deal' is transacted by 1 director to the value of R2,9 million, re-enforcing the signal.

Company	ShareCode	DirectorName	DirectorPosition	Qty	DealType	Price	FullDate	DealValue
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	2000	Buy	5960	03-Feb-03	R 119,200
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	2500	Buy	5970	04-Feb-03	R 149,250
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	2500	Buy	5990	04-Feb-03	R 149,750
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	7000	Buy	6000	04-Feb-03	R 420,000
REMGRO LIMITED	REM	Steyn P		51474	Buy	5800	26-Sep-03	R 2,985,492

On 3-Feb-2004, 1 director deals 5 times at or near to market price to the value of R660 thousand, triggering the 'number of deals' signal to sell.

Company	ShareCode	DirectorName	DirectorPosition	Qty	DealType	Price	FullDate	DealValue
REMGRO LIMITED	REM	Dreyer JW	Executive Director: Investments	36	Sell	7395	03-Feb-04	R 2,662
REMGRO LIMITED	REM	Dreyer JW	Executive Director: Investments	1000	Sell	7320	03-Feb-04	R 73,200
REMGRO LIMITED	REM	Dreyer JW	Executive Director: Investments	1932	Sell	7350	03-Feb-04	R 142,002
REMGRO LIMITED	REM	Dreyer JW	Executive Director: Investments	2032	Sell	7330	03-Feb-04	R 148,946
REMGRO LIMITED	REM	Dreyer JW	Executive Director: Investments	3996	Sell	7345	03-Feb-04	R 293,506

27-Jul-2004, 1 director deals 11 times at or near to market price to the value of R1,75 million, triggering the 'number of deals' signal. The 13-Aug-2004 re-enforces this signal by becoming the 3rd 'consecutive buy deal' when another director buys shares worth R1 million.

Company	ShareCode	DirectorName	DirectorPosition	Qty	DealType	Price	FullDate	DealValue
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	4000	Buy	7605	22-Jul-04	R 304,200
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	137	Buy	7665	27-Jul-04	R 10,501
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	400	Buy	7660	27-Jul-04	R 30,640
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	800	Buy	7660	27-Jul-04	R 61,280
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	1800	Buy	7665	27-Jul-04	R 137,970
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	2000	Buy	7651	27-Jul-04	R 153,020
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	2000	Buy	7657	27-Jul-04	R 153,140
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	2150	Buy	7665	27-Jul-04	R 164,798
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	2463	Buy	7665	27-Jul-04	R 188,789
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	2500	Buy	7676	27-Jul-04	R 191,900
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	3000	Buy	7665	27-Jul-04	R 229,950
REMGRO LIMITED	REM	De Jager GD	Independent Non-Executive Director	5700	Buy	7665	27-Jul-04	R 436,905
REMGRO LIMITED	REM	Van Wyk T	Executive Director: Investments	24466	Buy	4360	13-Aug-04	R 1,066,718

30-Nov-2004 is an option only deal and thus ignored. 8-Feb-2005 is a buy deal but way below market price and thus also ignored. The balance of the dates of interest show buy signals, thus simply re-enforcing the previous buy signal and would not change the outsiders' position in Remgro.

Remgro Exhibit ends

Thus it seems the triggers seem to have no strong correlation to the market returns of the share, calling the efficacy of directors' dealings into serious question.

Going back to the Naspers share, if the study period had started any time after Oct-02, Naspers would not have triggered at all, and the returns would not have realised. As such, the Outsider Portfolio return was re-calculated without the Naspers trigger to investigate the impact.

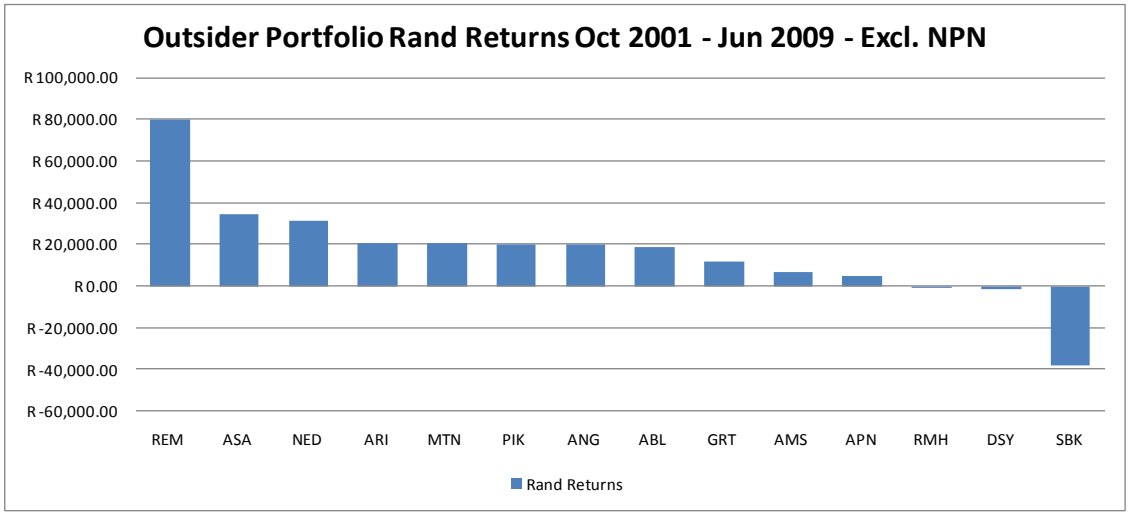


Figure 12: Individual share performance over the study period – Excl. NPN

The overall Outsider Portfolio return without Naspers was only 246.89%, significantly lower than before. This is only very slightly above the mean for 20,000 random portfolios returns which sits at 245.22%. That is, without the contribution of the Naspers returns, the Outsider Portfolio trading strategy was no better than the average random portfolio.

This seriously calls into question the validity of the result when it is so sensitive to the removal of only one trigger over the entire study period.

Also, 246.89% equates to an annual compounded return of 16.8% which would drop further if transaction costs were accounted for. This return starts looking very marginal when a simple investment in the J550 Consumer Services index over the same period delivered 323.84% or an annual compounded return of 19.8%.

As a result of this final stage of the proposed study methodology, a positive response to the research question which asked “Can outside investors earn abnormal excess returns by purchasing a share after intensive directors’ purchase activity, and selling the share after intensive directors’ sales activity?” cannot be confirmed. The uncertainty raised by the structure of the returns to the Outsider Portfolio refutes any prior evidence to the contrary. Although there is strong evidence for a positive response, in the final analysis, the result must remain inconclusive until such time as further research can prove otherwise.

This finding rings true with the findings of Lakonishok and Lee (2001) who found that outperformance was possible when at least three different directors purchased sizeable amounts in *small companies*, but did not find this effect for either *large companies*, or for sale trades. This research was conducted on the 40 largest cap companies on the JSE. Had it been conducted on the Alt-X, the finding may well have been different.

Jeng et al. (2003) propose an interesting hypothesis about the lack of profitability of CEO’s trades, that could also apply to large companies. They proposed that CEO’s are more likely to be more carefully scrutinised by analysts and regulators and thus may be more reluctant to trade on their informational advantage. This could just as well apply to large companies on the JSE and provide an explanation for the inconclusive result.

4.3. Summary of the Results

In answer to the research question “Can outside investors earn abnormal excess returns over the longer term, by purchasing a share after intensive directors’ purchase activity, and selling the share after intensive directors’ sales activity?”, the researcher arrived at an inconclusive result and recommends further research in order to confirm either a solid positive or solid negative response.

CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter summarises the findings of this report and conclusions that have been made.

5.2. Conclusions of the Study

The purpose of this research report was to establish whether an outsider could build a long term and profitable trading strategy on the JSE by trading only on receipt of an intense directors' dealing signal as the key strategy driver.

The findings initially looked astoundingly positive with a 595.43% return over the study period when acting on signals identified by the Outsider Portfolio Strategy. This translated to a 27.4% annual compounded return which is significant return on investment by many standards. It also ranked in the 95.8 percentile against 20,000 randomly generated portfolios which added further weight to the initial positive response. However, on investigation of the structure of that return, it was discovered that 36% of that return came from only one of the fifteen shares that triggered. Investigating that share, and others that delivered return, no correlation what-so-ever could be found between the periods of high performance and the triggers for the shares. Unfortunately, a trading strategy cannot be decided on the strength of only one share and as such the findings for the research question remain inconclusive until further investigation and research can be conducted.

5.3. Recommendations

This section deals with recommendations to stakeholders identified at the beginning under the heading "Significance of the research", based on the outcome of the research.

At this stage it is unclear if potential investors could build a long term profitable trading strategy based on signals embedded in intensive trades by directors.

There was much evidence 'for' the case, but also more than enough to cast doubt. It is thus recommended that further research be done in a few years time once more data has been accumulated, in order to confirm the result more conclusively.

On the question of director trading behaviours with regards to dealing in the securities of their own companies, no obvious patterns or characteristics of trading behaviours could be found. There were also no obvious similarities between directors trading behaviours across companies listed on the JSE. In fact, trading seemed to be totally 'chaotic'. This is a somewhat disappointing finding as one would hope that directors who were properly invested in their firms (mentally and emotionally) would trade in the shares of their firms on the basis that their [good] performance would positively impact the share price. Future research may use some type of content analysis or pattern matching methodology to expose any patterns or behaviours that might be evident in the data.

This research report also intended to contribute to the debate around the profitability of directors' dealings and thus the efficiency of the market, as well as the appropriateness of regulations imposed by the JSE with regards to directors' dealings. As can be seen from Appendix A, there were a number of cases where suspected insider trading occurred which to the researcher's knowledge, have not been investigated (refer Standard Bank, Bidvest, and Truworths in Appendix A). This poses questions as to either the appropriateness of the regulations, or the effectiveness with which the regulations are imposed. This may warrant further investigation.

5.4. Suggestions for Further Research

As a result of the inconclusive finding on question one, a number of questions are raised which could be addressed in future research.

Firstly, in years to come, as data is accumulated, the research could be extended to include that data. This would allow investigation into the continuation or not of the significant returns achieved in this study. This

assumes that the individual contributions of the triggered shares which cast doubt in this instance would be ignored.

Future research should also manipulate the thresholds defined for the ‘number of deals’, the ‘deal value’ and the ‘consecutive deals’ triggers. Lowering the thresholds on the signals to increase the number of valid signals identified might produce a more conclusive result over the same set of data. For example, dropping the consecutive buy deals to 2 and the consecutive sell deals to 3, dropping the deal value signal to R2 million in one day, and dropping the number of deals to 2 deals in one day might reveal more about the information content of a director’s trade. It is possible that directors might avoid trading above the thresholds defined in this report in order to remain on the right side of regulations around insider trading. Smaller more frequent deals might raise fewer alarms.

This research report accepted multiple deals on one day as a signal, regardless if those deals were concluded by one director or more than one. In line with the thinking of Fidrmuc et al. (2006) who concluded that CEO purchases that are accompanied by purchases by other directors have higher information content than do purchases by the CEO alone, future research could ensure that when there are multiple deals in one day, that they are concluded by more than one director.

All of the intensive trade signals in this report were confined to activity on one day only. Future research could widen this window to a week or even a month as per past research (Lorie and Niederhoffer 1968; Jeng et al. 2003; Fidrmuc et al. 2006)

This research report investigated a strategy that relied on the upside of the market only, taking long positions in shares that triggered a ‘buy’ state. When that trigger reversed, the position in the share was released in favour of other shares in the ‘buy’ state. Future research should investigate a trading strategy that takes a short position in companies in a ‘sell’ state in order to continuously have a position in that share whether long or short. This would allow

investigation into the possible out performance on the downside of the market as well as the upside.

As mentioned in recommendations above, there was evidence of possible insider trading detected in a number of companies. This could be an interesting topic for future research

The study was conducted on the Top 40 companies of the JSE only. It could also in future be done on the smaller caps or even Alt-X on the JSE. The hypothesis here would be that smaller companies are observed less frequently by investors, traders, regulatory authorities etc, and that these companies offer greater opportunity for directors to profit from trading in the shares of their own companies.

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APPENDIX A – DETAILED ANALYSIS

The detailed analysis appendix runs to over 100 pages and thus has not been reproduced here in text. Specific examples can be found in the body of this document from page 53 to 64. For the balance, please refer to the CD attached.

APPENDIX B – MS EXCEL MODELS

These models run to hundreds of thousands of cells and thus cannot be reproduced here in text. Please refer to the CD attached for Excel Models.