

Profitability of directors' share dealings on the JSE

1. INTRODUCTION

Directors are generally assumed to be better informed than the average outside investor about the prospects and value of their companies (Lakonishok & Lee, 1998; Roth, 1999). Therefore when directors buy and sell shares in their own company, their trading activities might provide valuable information regarding the outlook and share prices for these firms. Outside investors (a person without any privileged relationship with a company; also called "outsiders") might conclude that benefits can be derived from watching and then copying directors' actions in their firm's shares (Lorie & Niederhoffer, 1968; Lakonishok & Lee, 1998).

Directors of companies on the JSE Securities Exchange South Africa have had to disclose dealings in the shares of firms on whose boards they sit since 2 October 2000 (JSE Securities Exchange, 2000). For the first time, outside investors have access to regular information about the share transactions of directors of listed companies in South Africa.

This paper investigates whether directors earn abnormal returns from trading in the shares of their companies. If the results prove encouraging, they can be used as a first step in building a profitable trading strategy for outside investors.

"Abnormal returns" or "outperformance" are relative terms and require comparison to a benchmark in order to have meaning. Two benchmarks are employed to determine whether directors achieve outperformance.

The first benchmark is employed to investigate whether the fact that a director traded in a share *alone* resulted in the share's subsequent outperformance. Stated another way, it attempts to measure whether directors' transactions are informative to outside investors.

In order to discover if such a "directors' effect" exists, all other possible market "effects" or "anomalies" (discussed below) that could in themselves be the cause of observed outperformance need to be stripped out of returns.

The second benchmark leaves undisturbed any impact from market effects in share returns. It provides a useful comparison with the former model as the influence of market effects, if any, on returns can be measured.

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2. LITERATURE REVIEW

2.1 Existing studies

No academic research on the profitability of insider trading in South Africa was found although two pieces of stockbroker research were located (Arntz, Murray & Napier, 2001, 2002). The literature review therefore relies predominantly on international studies, in which directors' dealings are generally called "insider trading/dealings".¹

Research on the profitability of insider trading has been conducted in numerous markets around the world including on bourses in Canada (Heinkel & Kraus, 1987; Lee & Bishara, 1989), Great Britain (Pope, Morris & Peel, 1990), Norway (Eckbo & Smith, 1998) and Hong Kong (O'Reilly and Halili in Clifford, 1993). By far the bulk of the research has been carried out in the United States.²

These studies generally have found that insiders collectively do profit in varying degrees from trading in their company's shares. For example, Jaffe (1974) found insiders could earn abnormal returns of 1,4% for shares traded and held for eight months. Two years later, Finnerty (1976b) reported excess returns for insiders of 8,3% from purchases held for 12 months and 4,8% from sales.

A study by Givoly and Palmon (1985) revealed abnormal returns for insiders of 7,5% from shares purchased and held for a year and 11,5% from sale transactions over the same period. Bettis *et al* (1997) found purchases gave directors outperformance of 11,7% after a year while sales provided an 8,5% excess return. Jeng *et al* (1999) reported a 7,4% abnormal return for directors from their purchases, but found that sales transactions did not outperform the market.

A handful of studies found that insiders do not beat the market with their share dealings. Eckbo & Smith (1998), who studied insider trading on the Oslo Stock Exchange during a period of lax regulation, found that even at a time when more illegal insider activity was

¹This term includes directors as well as other persons who have access to privileged company information, such as senior managers who are not directors. The term is not meant to convey the pejorative meaning it has developed in South Africa.

²Researchers in US markets include Lorie & Niederhoffer (1968), Jaffe (1974), Finnerty (1976a, 1976b), Nunn, Madsen & Gombola (1983), Givoly & Palmon (1985), Seyhun (1986, 1988, 1992), Rozeff & Zaman (1988), Bettis, Vickrey & Vickrey (1997), Lakonishok & Lee (1998), Jeng, Metrick & Zeckhauser (1999) and Roth (1999).

possible, corporate insiders neither outperformed the overall market nor an average mutual fund.

Several researchers found that insiders' purchase transactions were more lucrative than their sales (Finnerty, 1976b; Lee & Bishara, 1989; Bettis *et al.* 1997; Lakonishok & Lee, 1998; Jeng *et al.*, 1999). This phenomenon has been attributed to the different motives involved in buying and selling shares. The argument usually made is that there are many reasons why insiders sell shares. These include meeting liquidity needs or diversifying portfolios built up through executive share option schemes. There is, however, generally only one reason why insiders buy shares: to make money. Therefore share purchases are more likely to reflect information about the value or prospects of a company than sales (Nunn *et al.*, 1983; Bettis *et al.*, 1997; Lakonishok & Lee, 1998; Jeng *et al.*, 1999).

Rozeff and Zaman (1988) argued that the abnormal returns earned by corporate insiders were largely a result of biases in the asset-pricing models that researchers used to calculate abnormal returns. Once abnormal returns were adjusted for the market effects of size and value insiders' profits disappeared for all holding periods except 12 months.

2.2 Asset pricing models and market anomalies

The Capital Asset Pricing Model (CAPM) and related asset pricing models have most frequently been used in insider trading studies to calculate returns. However, the efficacy of simple CAPM methodologies to measure expected stock returns has been widely criticised over the past 15 years (Fama & French, 1992, 1993, 1996; Kothari, Shanken & Sloan, 1995; Jagannathan & Wang, 1996).

Fuelled by a pioneering article by Fama and French (1992), several researchers, most focusing their work on U.S. stock markets, have argued that a single factor beta model provides little if any explanation for the cross-section of expected share returns. Instead characteristics including company size, book equity to market equity ratios (book-to-market), earnings-to-price ratios (E/P) and leverage provide better explanations of returns (Fama & French, 1992, 1993, 1996). These characteristics are collectively known as market "effects" or "anomalies", anomalies because traditional risk models such as the CAPM were unable to explain their existence.

Fama and French (1992:450), in their hunt for a simple but effective asset pricing model, argue that as the various documented market effects are really just "scaled versions of price, it is reasonable to expect that some of them are redundant for explaining average returns". A key finding of their study was that company

size and book-to-market provide a superior explanation of average share returns and together are able to "absorb the apparent roles of leverage and E/P in average returns" (Fama & French, 1992; 1993:4; 1996).

Fama and French (1993, 1996) built a three-factor returns-generating model which they said provided a good explanation of the expected returns of shares across the market. This model states that the expected return of a stock (in excess of the risk-free rate) is explained by the sensitivity of its return to three factors: the market return (in excess of the risk-free rate again), the underlying company's market capitalisation (size) and its book-to-market ratio (value) (Fama & French, 1996).

According to Fama and French, (1996:55) when using this model "the anomalies largely disappear". The three-factor model is expressed by the formula (Fama & French, 1996):

$$(R_{it} - R_{ft}) = \alpha_i + \beta_{i,1}(R_{mt} - R_{ft}) + \beta_{i,2}SMB_t + \beta_{i,3}HML_t + \epsilon_{it}$$

where

- R_{it} = actual return of stock_i in period_t
- R_{ft} = risk-free rate in period_t
- α_i = the alpha intercept term
- $\beta_{i,1}$ = the market beta
- R_{mt} = the benchmark or market index return in period_t
- SMB_t = small minus big: the return on the market portfolio of small stocks (measured by market capitalisation) minus the return on the portfolio of big shares
- HML_t = high minus low: the return on the market portfolio of value shares (high book-to-market ratio) minus the return on the portfolio of growth shares (low book-to-market ratio)
- $\beta_{i,2}$ = coefficient of tilt or factor sensitivity towards small companies and away from big companies.
- $\beta_{i,3}$ = coefficient of tilt towards value companies and away from growth companies

ε_{it} = the error term

2.2.1 Size effect

The effect of company size on across-market returns was first documented by Banz (1981). He found that the abnormal returns of the shares of companies with small market capitalisations, when estimated by the CAPM, tended to be positive, while those for large capitalisation companies tended to be negative. The size effect, stated simply, says that small capitalisation companies will on average outperform those with large market values.

2.2.2 Value effect

The existence of a relationship between share returns and a measure of company value, for example E/P or book-to-market, is termed the value effect.

This anomaly was first identified by Basu (1983) who found a relationship between the returns of shares on the NYSE between 1963 and 1980 and their E/P ratios. He found that companies with high E/P ratios on average tended to have higher returns than those with low E/P ratios.

The value effect has also been investigated using the book-to-market ratio. Companies with high book-to-market ratios (commonly termed value companies) tend to outperform firms with low book-to-market ratios (commonly termed growth companies) (Fama & French, 1992, 1993; Lakonishok, Shleifer & Vishny, 1994).

2.2.3 Market anomalies on the JSE

Most of the research into market effects has been conducted on bourses in the United States. Evidence of anomalies on the JSE has been mixed.

A number of researchers, using a variety of samples of shares in the period between 1973 and 1995, found no evidence of a size effect on the JSE (De Villiers, Lowings, Pettit & Affleck-Graves, 1986; Page & Palmer, 1991; Barret, 1996; Robins, Sandler & Durand, 1999). De Villiers *et al.* (1986) in fact found that large companies outperformed small firms.

However, Mutooni (2001:ii) using the population of JSE listed industrial stocks between 1986 and 2000 found that "value and small cap stocks outperformed their growth and large capitalisation counterparts by large margins". Mutooni (2001) suggested that this contradictory finding might be attributed to previous researchers' use of a random sample of shares (as opposed to his research which used the entire population). Their sampling might have introduced, he contended, "some form of bias" into their findings (Mutooni, 2001:80). The superior investment

performance by value and growth shares discerned by Mutooni (2001) was, however, not seamless and was interrupted by periods when growth and large capitalisation stocks were the stronger performers.

Gates (1997) concluded that a significant value effect existed amongst JSE industrial shares in the period 1986 to 1996. This finding concurred with the results of several others (Plaistowe & Knight, 1986 in Robins *et al.*, 1999; Page & Palmer, 1991; Graham & Uliana, 2001) but clashed with the results of Robins *et al.* (1999) who discerned no such effect.

Van Rensburg (2001) found that three style factors -- value, size and momentum -- explained the expected returns of JSE industrial shares between February 1983 and March 1999.

2.2.4 "Dual nature" of the JSE

Gilbertson and Goldberg (1981) argued that the JSE was different from many other stock markets in that mining companies, predominantly gold mines, made up a sizeable proportion of its market capitalisation. They argued that the performance of these shares was dominated by the gold price, which had little impact on the other major segment of the market, the industrial sector. The performances of these two dominant sectors at any one time might therefore be very different. According to Gilbertson and Goldberg (1981) any asset-pricing model used to calculate returns on the JSE would be enhanced by taking account of this dual nature of the market.

Van Rensburg and Slaney (1997, in Van Rensburg, 2001) showed that a two-factor model, which took account of the separate dimensions of resource and non-resource sectors on the JSE, was better specified as an asset pricing model than the traditional single-factor CAPM.

2.2.5 Market effects and insider trading studies

Studies on the profitability of insider trading set out to establish if abnormal returns are earned following insiders' transactions. If market effects such as size and value are present in a market, abnormal returns might be found merely as a result of these effects and not because of the "information content" of the insider transaction (Seyhun, 1986; Rozeff & Zaman, 1988; Bettis *et al.*, 1997).

In order to remove the impact of market effects, insider trading researchers have used various techniques. Some used models such as Fama and French's (1992, 1993, 1996) three-factor model (Jeng *et al.*, 1999). Others constructed "control portfolios" either as an "add-on" after abnormal returns had been determined by a CAPM-based model (Rozeff & Zaman, 1988; Bettis *et al.*, 1997; Lakonishok & Lee, 1998) or as an

integral part of the actual returns-generating model selected (Jeng *et al.*, 1999). Whichever approach was chosen, the formation of control portfolios is fairly well documented.

Control portfolios are built comprised of all shares in the market divided into groups based on the market anomaly to be filtered out, if present. For example, if the size and value effect was to be stripped out, one control portfolio could house the shares whose market capitalisation and book-to-market ratio qualify them as small, value shares. Another could group together those shares whose size and book-to-market ratio characteristics qualify them as large, growth shares.

Once each share in the market has been placed in the control portfolio matching its characteristics, an average abnormal return is calculated for each portfolio from the returns of all the individual shares in it using a chosen asset-pricing model.

In the case of the "add-on" control portfolio, once the abnormal return of the individual stock in question has been calculated, it is compared with the average abnormal return of the control portfolio in which this same share would have been located at time of the transaction. If the stock's return is smaller than the average return of the control portfolio, it is concluded that its abnormal return merely came about due to the impact of the market effect and not due to the insider transaction itself.

A returns-generating model in which control portfolios are the "guts" of the model is the Characteristic Selectivity (CS) measure of Daniel, Grinblatt, Titman and Wermers (1997). In this model, control portfolios or "bins" are formed as described above based on the characteristics of size, book-to-market and momentum. An abnormal return for a share is calculated by subtracting from its actual return the calculated return for the bin or control portfolio which matches the stock's characteristics in the same time period (Daniel *et al.*, 1997; Jeng, *et al.*, 1999).

3. RESEARCH METHODOLOGY

The null hypothesis states that the cumulative abnormal return (CAR) on the shares traded by directors is not significantly different from zero.

The alternative hypothesis states that the CAR on the shares traded by directors is significantly different from zero.

$$H_0 : CAR_t = 0$$

$$H_A : CAR_t \neq 0$$

where

$$CAR_t = \text{the cumulative average abnormal return during the post-transaction period or event window}_t$$

The hypothesis was tested for the overall sample of directors' transactions as well as separately for sub-samples of purchases and sales transactions.

The research population comprised the universe of all directors' dealings on the JSE. The sample is all directors' dealings transacted and publicly announced through SENS between 2 October 2000 and 31 March 2002. The starting date was "selected" because it was the first day directors were required to disclose their share trading activities. The end date was determined by when this research was conducted.

A total of 2 968 transactions were executed and declared by directors between 2 October 2000 and 31 March 2002. A number of data exclusions were made from this original sample. In line with previous insider trading studies, omissions included all transactions that took place in shares which were not ordinary shares; transactions involving the exercise of options and, where indicated as such, the sales of these option-acquired shares, and transactions involving the restructuring by directors of their share portfolios.

Share option exercises' were excluded as these purchase transactions are typically carried out at prices below market prices and are therefore not comparable to market returns. Any bias introduced by this omission would tend, anyway, to understate the abnormal returns earned by directors (Finnerty, 1976b).

The exclusion of option-related sales, where stated as such, as well as transactions involving the restructuring of directors' portfolios, was done on the grounds that these trades are not informative but done rather out of a desire by a director for liquidity or diversification. This study is concerned with directors' "true" sales and purchases. Any trading strategy for outsiders based on directors' transactions would therefore disregard these trades.

The final sample comprised 2 549 transactions. As far as possible, attempts were made to avoid survivorship bias and delisted shares remained in the sample until the day of their delisting. New listings were included from their first trading day.

Data on the transactions of directors were obtained from Factiva, a database product of Reuters Plc and Dow Jones, and a vendor of the JSE SENS data feed.

Various share data were extracted from I-Net-Bridge (Pty) Ltd and McGregor BFA (Pty) Ltd. The data required were:

- daily closing prices for all shares listed on the JSE between 29 September 2000 and 31 March 2002. Data was collected up until 30 April 2002 so that the performance of directors' transactions that took place at the end of March 2002 could at least be tracked for one month;
- market capitalisation data for all shares listed between 29 September 2000 and 31 March 2002;
- annual price-to-book ratios for all shares listed on the JSE between 29 September 2000 and 31 March 2002. These ratios, which are calculated by dividing the price per share by the book value per share, were obtained from the McGregor BFA database.

McGregor BFA's definition of book value is ordinary share capital plus non-distributable and distribution reserves less the cost of control of subsidiaries less intangible assets. The price in the price-to-book ratio is calculated by dividing the total monetary value of the shares traded in the last month of the company's financial year by the number of shares changing hands in that month.

4. DATA ANALYSIS

In keeping with most international studies on the profitability of insider trading, the event study methodology was employed to test for abnormal performance.³

The event of interest is the director's share transaction. The event date was the day on which a director transacted in the shares of her company. This was denoted as "Day₀".

The impact on the price of the share in which the director's transaction took place was measured daily over a year, starting from a fixed event day, Day₀, through to Day₀₊₂₅₂. Taking into account public holidays, each month has on average 21 trading days (21 x 12 = 252 days = one year).

Two models were used to calculate abnormal share returns. In the light of evidence of the existence of at least two market effects on the JSE – size and value – an asset-pricing model incorporating control portfolios was constructed to strip out these effects. This approach is in line with the work of other insider trading researchers (Seyhun, 1986; Rozeff & Zaman, 1988; Bettis *et al.*, 1997, Lakonishok & Lee, 1998, Jeng *et al.*, 1999).

³Other insider trading researchers using the event study method include Jaffe (1974), Finnerty (1976b), Givoly & Palmon (1985), Seyhun (1986), Rozeff & Zaman (1988), Bettis *et al.* (1997), Eckbo & Smith (1998), Lakonishok & Lee (1998) and Roth (1999).

Gilbertson and Goldberg (1981) and Van Rensburg (2001) point out that the JSE is different from other stock markets in that half of the shares on the bourse are strongly influenced by commodity prices, especially gold, while the other half are not. In order to smooth out this imbalance, a third "extra-market" factor was also taken account of in the development of a returns-generating model. Here termed the "resources effect", its impact is similar to that of size and value: it provides a better explanation for the cross-section of returns over and above that afforded by traditional asset-pricing models.

The returns-generating model developed was closely based on that of Fama and French (1993, 1996) and Daniel *et al.* (1997). For ease of reference and to describe its function this model has been called the Market Effects Control Model.

To form control portfolios each market effect was considered to be one of two states: a share's size was either small or large; for the value effect a share was either a value or a growth share; and for the resources effect a stock was either a resource or a non-resource counter. A description on the mechanics of constructing the control portfolios is contained in the Appendix to this paper.

Eight factor-mimicking portfolios were constructed, representing all possible combinations of the three market effects, as shown in Table 1.

Table 1: Factor-mimicking control portfolios

	Large		Small	
	Value	Growth	Value	Growth
Resources	LVR	LGR	SVR	SGR
Non-resources	LVN	LGN	SVN	SGN

Key: LVR = Large, Value, Resources
 LVN = Large, Value, Non-resources
 LGR = Large, Growth, Resources
 LGN = Large, Growth, Non-resources
 SVR = Small, Value, Resources
 SVN = Small, Value, Non-resources
 SGR = Small, Growth, Resources
 SGN = Small, Growth, Non-Resources

Mimicking Fama and French's (1993) three-factor model, beta coefficients or factor loadings were calculated for each share in the sample by regressing the share's daily returns over the 18-month period against the daily returns of each of the eight control portfolios in the same period. An alpha coefficient for each share was also obtained from the regression equation. Cognisance was therefore taken of the possibility that each share's return may be sensitive in varying degrees to the returns of all shares in the market and not solely to the returns of the shares in the control portfolio whose characteristics it matched.

In this way, the model differed from the Daniel *et al.* (1997) CS model which only subtracts from the share in question the return of its characteristic-matching portfolio.

In summary, the Market Effects Control Model measures the expected return of share_{*i*} in period_{*t*} as the sum of the sensitivity of share_{*i*} to the returns of eight factor-mimicking portfolios and a calculated alpha estimate in period_{*t*}. Although straightforward in practice, it is notationally unwieldy when summarised in a formula:

$$E(R_{i,t}) = \alpha_{i,t} + \beta_{i,1}SVN_t + \beta_{i,2}SVR_t + \beta_{i,3}SGN_t + \beta_{i,4}SGR_t + \beta_{i,5}LVN_t + \beta_{i,6}LVR_t + \beta_{i,7}LGN_t + \beta_{i,8}LGR_t + \varepsilon_{i,t}$$

where

$E(R_{i,t})$ = expected return of stock_{*i*} in period_{*t*}

$\alpha_{i,t}$ = alpha intercept term of stock_{*i*} in period_{*t*}

$\beta_{i,1} \dots \beta_{i,8}$ = beta coefficients or factor loadings on each control portfolio return

$\varepsilon_{i,t}$ = the error term

$SVN_t \dots LGR_t$ = returns on each of the eight control portfolios as described in Table 1 in period_{*t*}

Once an expected return has been calculated for stock_{*i*} in period_{*t*}, the abnormal return is simply the actual return of share_{*i*} in the same period less the calculated expected return:

$$A(R_{i,t}) = R_{i,t} - E(R_{i,t})$$

where

$A(R_{i,t})$ = abnormal return of stock_{*i*} in period_{*t*}

$R_{i,t}$ = actual return of stock_{*i*} in period_{*t*}

$E(R_{i,t})$ = expected return of stock_{*i*} in period_{*t*} as calculated by the constructed returns-generating model

The actual return on stock_{*i*} in period_{*t*} is calculated as:

$$R_{i,t} = \frac{P_t - P_{t-1}}{P_{t-1}}$$

where

P_t = the price of stock_{*i*} at the end of period_{*t*}

P_{t-1} = the price of stock_{*i*} at the beginning of period_{*t*}

Dividends were excluded.

A second returns-generating model, the well-known and simple Market Adjusted Returns Model, was also used to measure abnormal returns. This model was used by several insider trading researchers (Givoly & Palmon, 1985; Lin & Howe, 1990; Lakonishok & Lee, 1998; Roth, 1999).

Calculating abnormal returns using this model merely involves subtracting a broad market index from the actual return of a share and is expressed by the formula:

$$A(R_{i,t}) = R_{i,t} - R_{m,t}$$

where

$A(R_{i,t})$ = the abnormal return on stock_{*i*} in period_{*t*}

$R_{i,t}$ = the actual return on stock_{*i*} in period_{*t*}

$R_{m,t}$ = the market or relevant benchmark return in period_{*t*}

Insider trading studies require that abnormal returns from directors' sales transactions be multiplied by -1 so that they are positive for both purchase and sales trades. As all sales in insider trading studies are short sales, outperformance is indicated by a negative return as it occurs when the share involved *underperforms* the benchmark index.

In a traditional event study, the next step would be to calculate an average abnormal return for each day/month in event time with each transaction in the sample carrying *equal weight*.

In this study abnormal share returns were weighted by their initial transaction value. This was done because an equal weighting would have resulted in an arbitrary bias in favour of returns from those companies in which directors *appeared* to have traded most frequently. The bias stems from the different ways companies have reported their directors' trading activities on the JSE. Some reported every transaction on a day as a separate deal while others grouped several intra-day transactions into a single trade with an average price. If transactions were weighted equally, a greater weighting would arbitrarily be ascribed to companies that had reported their transactions one by one.

A weighting was calculated for each transaction by dividing the value of the transaction (the number of shares traded multiplied by the share price of the trade) by the total value of director dealings on the event day, Day₀. In this way, each transaction was given a percentage weighting in the total value basket of directors' trades.

Each abnormal return was then multiplied by this percentage weighting, resulting in a weighted abnormal return (WAR) for each transaction on each day.

A weighted average abnormal return (WAAR), for each event day was calculated by summing the weighted abnormal returns for each transaction earned on each day in event time according to the formula:

$$WAAR_t = \sum_{i=1}^n WAR_{i,t}$$

where

WAAR_t = weighted average abnormal return of all sample stocks at period_t

n = the number of stocks in the sample

WAR_{i,t} = weighted abnormal return of stock_i in period_t

Performance over an extended period was calculated by summing the WAARs according to the following formula:

$$CAR_T = \sum_{t=t_1}^{t_2} WAAR_t$$

where

CAR_T = Cumulative abnormal return in period_T

WAAR_t = weighted average abnormal return in period_t

T = t₂ - t₁ + 1

The significance of the CARs over a range of event windows was tested using a two-tailed t-test adapted from Lin & Howe (1990) to take account of the weighting of abnormal returns. The t-test formula is:

$$t = \frac{CAR(T_b, T_e) \cdot (T_e - T_b)^{1/2}}{[\sum_{t=T_b}^{T_e} \sigma(WAAR_t)^2]^{1/2}}$$

where

CAR(T_b, T_e) = cumulative abnormal return between time T_b and T_e

σ(WAAR_t) = standard deviation of WAAR_t between time T_b and T_e

T_b = the starting day of the event window

T_e = the final day of the event window

Significance of the CARs was tested at three levels: 1%, 5% and 10%.

5. RESULTS

5.1 Directors' overall sample

Figure 1 shows the CARs calculated for the collective class of directors who transacted and reported their trades on the JSE between 2 October 2000 and 31 March 2002. The CARs are shown for the period beginning with the event day, Day₀, for all transactions and then for holding periods increasing in increments of one day through to a maximum holding period of one year (Day₀₊₂₅₂).

Although returns for directors appear substantial in the period under review, in order to make generalisations about directors' dealings it is necessary to test statistically if the CARs are significantly different from zero. The results of these tests are shown in Table 2.

Column 2 of Table 2 shows there is a "directors' effect" in the immediate days after the transaction. Once the impact of size, value and resources are removed using the Market Effects Control Model, directors earned a significant abnormal positive return of 1,1% on the transaction day, Day₀. For a holding period of one day their return is a significant 1,9%. A maximum of 2,5% was earned for a holding period of five days. Beyond this holding period returns are no longer different from zero.

Column 3 of Table 2 shows that if market effects are not removed, that is, by using the Market Adjusted Returns Model, directors can earn substantial CARs over most holding periods up to a year. Directors can earn abnormal returns of up to 25,3% for shares held for a year. CARs are not significant for holding periods of one, four and 11 months.

The overall sample was then split into two sub-samples: purchases and sales.

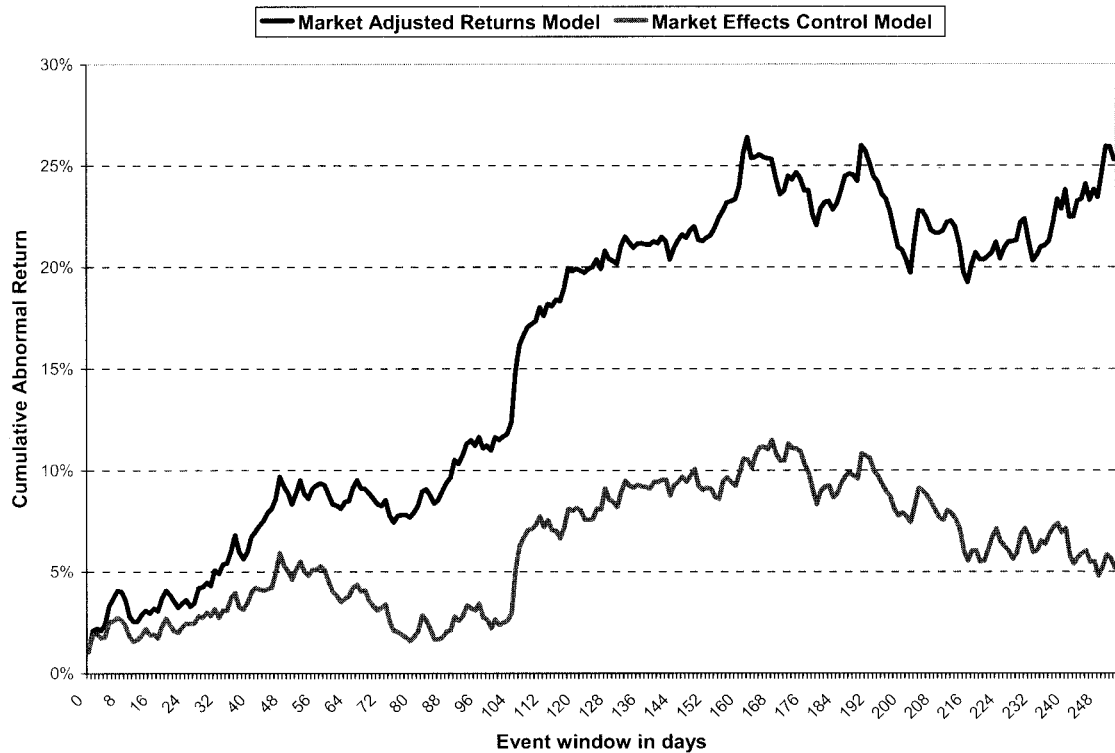


Figure 1: CARs for overall sample

Table 2: Significance of CARs for all samples

Event window	Directors' Overall Sample		Directors' Purchases Sample		Directors' Sales Sample	
	Market Effects Control Model	Market Adjusted Returns Model	Market Effects Control Model	Market Adjusted Returns Model	Market Effects Control Model	Market Adjusted Returns Model
Day 0	1.1% (19,26)	1.1% (13,36)	0.2% (16,1)	0.3% (17,67)	0.9% (12,35)	0.8% (8,13)
Day 0 to 1	1.9% (16,5)	2.1% (12,72)	0.5% (15,04)	0.6% (15,96)	1.4% (10,07)	1.5% (7,61)
Day 0 to 5	2.5% (5,52)	3.3% (6,1)	0.6% (8,48)	0.7% (9,24)	1.9% (3,49)	2.6% (3,96)
Day 0 to 21	2.1% (1,06)	3.5% (1,5)	0.3% (1,16)	0.5% (1,53)	1.7% (0,72)	3.1% (1,07)
Day 0 to 42	4.1% (1,33)	7.3% (1,89)	0.2% (0,38)	-0.2% (-0,25)	3.9% (1,03)	7.4% (1,59)
Day 0 to 63	3.7% (0,93)	8.4% (1,74)	-0.4% (-0,47)	-1.2% (-1,24)	4.1% (0,86)	9.6% (1,63)
Day 0 to 84	2.2% (0,47)	8.8% (1,54)	-1.3% (-1,01)	-1.5% (-1,13)	3.4% (0,61)	10.2% (1,48)
Day 0 to 105	5.1% (0,92)	14.9% (2,21)	-3.0% (-1,86)	-2.6% (-1,53)	8.1% (1,2)	17.4% (2,13)
Day 0 to 126	8.1% (1,27)	19.9% (2,61)	-3.0% (-1,58)	-3.2% (-1,53)	11.1% (1,44)	23.1% (2,49)
Day 0 to 147	9.4% (1,35)	21.4% (2,56)	-2.6% (-1,21)	-3.9% (-1,62)	12.1% (1,42)	25.3% (2,49)
Day 0 to 168	11.5% (1,49)	25.3% (2,71)	-3.0% (-1,14)	-5.4% (-1,80)	14.5% (1,55)	30.7% (2,7)
Day 0 to 189	9.6% (1,09)	24.2% (2,31)	-4.1% (-1,04)	-7.2% (-1,63)	13.7% (1,31)	31.4% (2,5)
Day 0 to 210	7.6% (0,78)	21.8% (1,84)	-5.2% (-1,16)	-7.8% (-1,53)	12.8% (1,11)	29.6% (2,08)
Day 0 to 231	6.7% (0,63)	21.3% (1,65)	-4.6% (-0,81)	-6.2% (-0,97)	11.4% (0,91)	27.4% (1,79)
Day 0 to 252	5.2% (0,45)	25.3% (1,78)	-4.5% (-0,73)	-4.5% (-0,65)	9.7% (0,72)	29.8% (1,76)

Numbers in brackets show significance level
 *** Significant at the 1% level
 ** Significant at the 5% level
 * Significant at the 10% level

5.2 Directors' purchases sub-sample

Figure 2 shows that abnormal returns are elusive for directors following purchase transactions on the JSE. In fact, over longer holding periods, directors underperform the benchmarks of both returns-generating models. Again it is necessary to test if the CARs are significantly different from zero.

Column 4 of Table 2 shows that when market effects are removed (the Market Effects Control Model), director-purchased shares outperform significantly for only three event windows: the day of the transaction when they outperform by a slim 0,2%, a holding period of one day (0,5%) and an event window of five days (0,6%).

When market effects are left undisturbed (Column 5 of Table 2) a similar picture emerges: directors can only earn a small 0,3% abnormal return on the transaction day, 0,6% one day after and 0,7% five days from Day₀.

5.3 Directors' sales sub-sample

Figure 3 shows returns for directors from sales transactions are superior to those from purchases.

Column 6 of Table 2 shows how without the effects of size, value and resources, abnormal returns are only significant on the transaction day (0,9%) and for short holding periods of one day (1,4%) and five days (1,9%). As all sales in this study are short sales, a "holding period" begins with a director selling a share -- the transaction date, Day₀ -- and ends with her buying back the stock.

Column 7 of Table 2 shows that if market effects are not stripped out, directors can earn considerably larger abnormal returns from their sales transactions -- up to a maximum of 31,4% after nine months. CARs are significant and positive for all monthly intervals except for a holding period of one, two, three and four months.

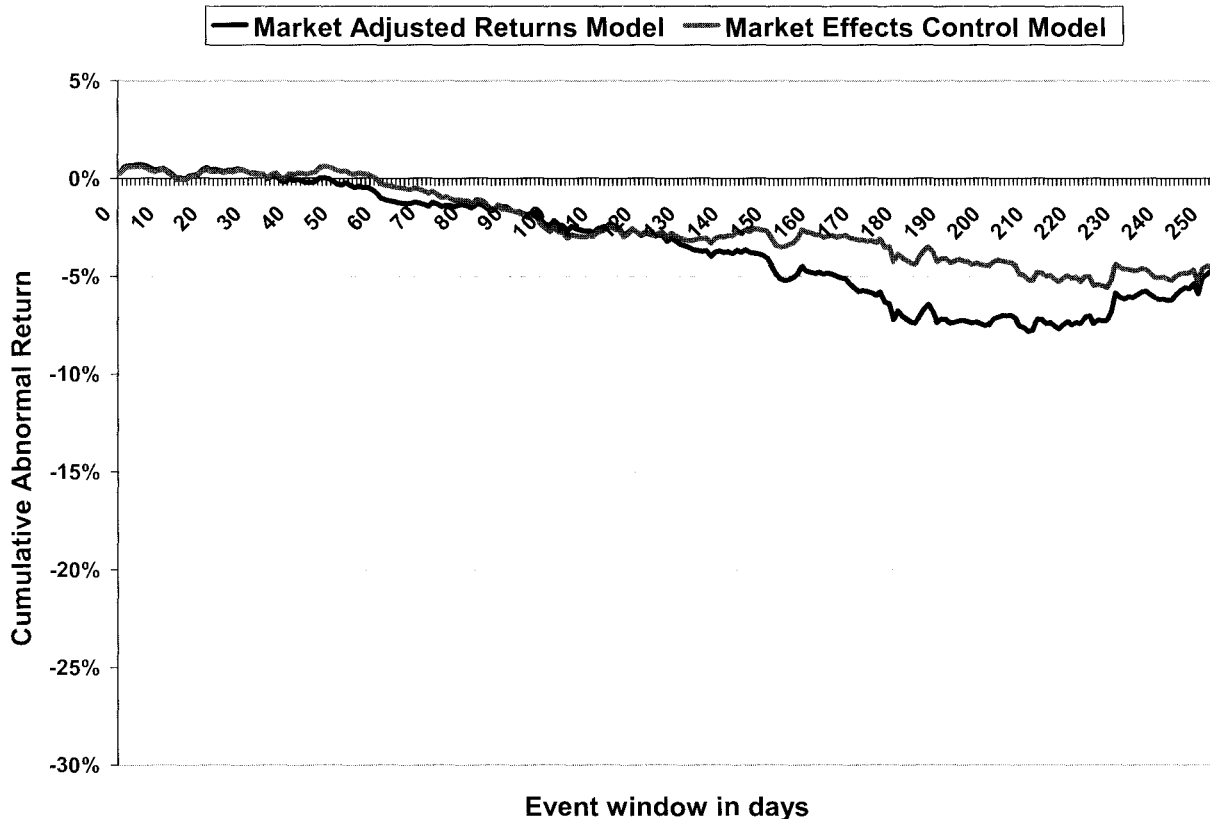


Figure 2: CARs for purchases sub-sample

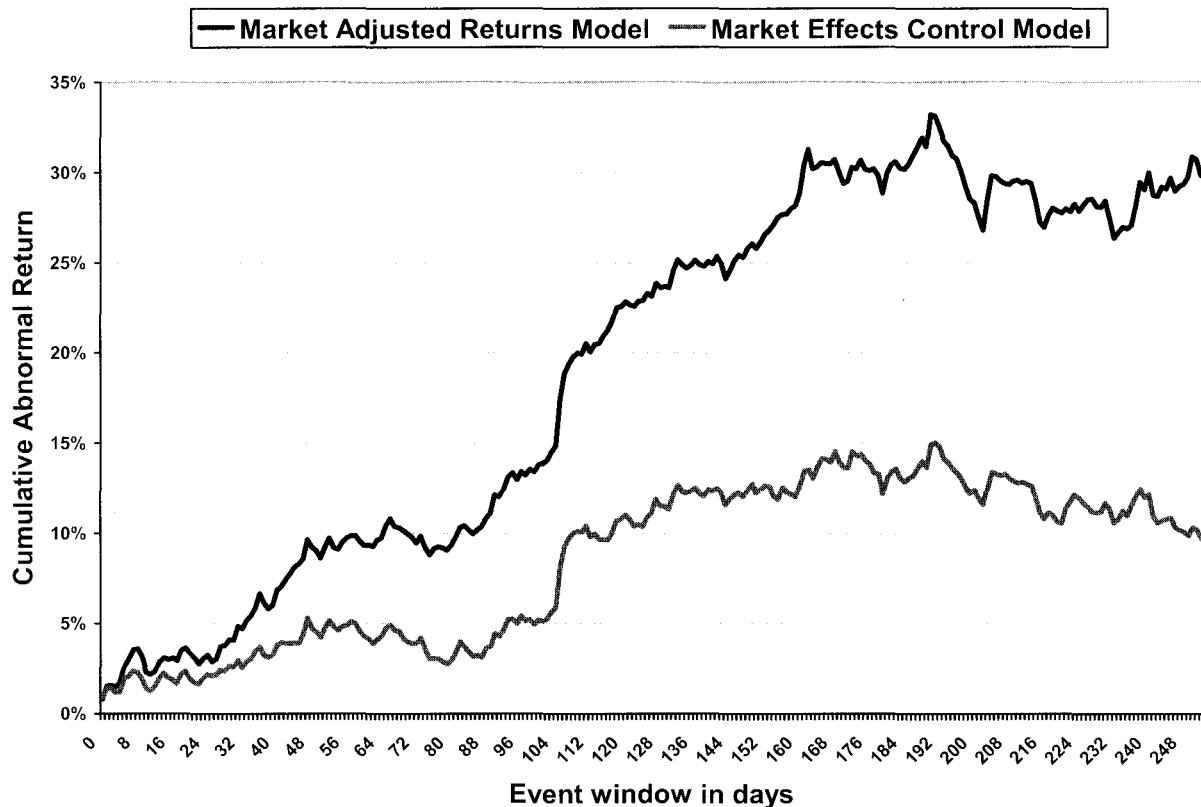


Figure 3: CARs for sales sub-sample

6. INTERPRETATION OF RESULTS

Directors of listed companies on the JSE can earn significant abnormal returns over certain holding periods from trading in the shares of their company. This is consistent with the bulk of international research on this topic.

However, when the impact of market effects -- in this case size, value and resources -- is stripped out of the returns, abnormal returns earned by directors reduce substantially, and in economic terms are meagre. The bulk of the returns available to directors on the JSE is therefore due to the existence of market anomalies and the characteristics of the shares directors buy and sell. This result is consistent with the findings of Rozeff and Zaman (1988:40) who argued that "size and e/p [value] effects are responsible for a large proportion of the abnormal returns that have usually been observed in insider trading studies".

In light of evidence that directors can earn statistically significant CARs, even after the removal of market effects, the null hypothesis is rejected and the alternative hypothesis accepted.

The results of this research diverge from common international findings in one key aspect: the driver of abnormal returns. This study reveals that directors earn superior abnormal returns from their sale transactions than from their share purchases (this is

more pronounced when the impact of market effects is not removed, but is also evident in small measure when they are taken out). In other words, directors appear to be better at selling ahead of share weakness than buying before share strength.

Possible explanations for the different findings in this study might be:

- compared with other studies (especially in the United States), the sample used here is likely to contain a lower content of sales transactions involving the sale of shares obtained through share option purchases. A reason for this is that share options comprise a lower percentage of the salary of South African directors than in the United States (Fox & Birnbaum, 2002). As a proportion of total transactions, fewer sales transactions in this study are therefore options-related. By implication a greater proportion of sales transactions might be informative;
- in this study returns were weighted by their initial purchase or sale value. In event studies, returns are generally equally weighted. As the value of sale transactions in the sample is higher than that of purchase transactions (R1,4 billion compared with R881 million), a greater weighting will be attached to sales trades and their performance will be magnified;

- directors' sales may be regarded as a stronger signal by outsider investors than their purchases. Outsiders may more readily have followed directors' sales than their purchases and, in selling shares, they might have depressed prices;
- cynics might argue that South African directors are better at bailing out of their shares ahead of a poor performance by their company than at investing before a good period.

7. CONCLUSION

The purpose of this study was to investigate whether directors earn abnormal returns from transactions in their company's shares.

Mirroring earlier work, it is shown that directors can earn abnormal returns from their share transactions. However, the bulk of this outperformance is as a result of the influence of the market effects of size, value and resources and not due to the fact that the director traded in the share.

In contrast with common findings in other markets, sales transactions are a more pronounced source of outperformance than purchases.

A simple and profitable trading strategy for outsiders is not immediately obvious. As the major proportion of abnormal returns appear to be caused by extra-market factors rather than by directors' transactions, an outside investor might do just as well, or even better, following a style investment strategy than mimicking directors' actions.

That said, directors appear to be good at style timing when it comes to sale transactions. However, all sales transactions in this study are short sales, an activity more expensive and complex than straight purchases and sales.

The development of trading strategies for outsiders based merely on mimicking insiders' trades is therefore not a simple exercise. However, directors' dealings do provide some potentially useful trading signals, possibly as a loss-avoidance strategy.

One should, however, note some limitations in this study. Given that the sample commences at the inception of share dealing disclosure for directors, it is plausible that at least in the initial months not all trades were disclosed as directors took time to familiarise themselves with the new regulations.

As there is no public information on the actual share holding periods of directors, the event study technique imposes artificial event windows onto the data. The calculation of abnormal profits is fundamentally an artificial construct and does not necessarily measure

the actual profits made by directors. There have been attempts by researchers to more closely approximate the actual holding periods of directors (Eckbo & Smith, 1998).

To deal with the problem of inconsistent disclosure of trades between companies, transactions were weighted by their initial purchase or sale value. In traditional event studies, all transactions are weighted equally. The use of weighting in this study may have introduced a bias that has not been discerned.

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Appendix

Construction of control portfolios

A company's size was measured by its market capitalisation. Data on each company's market capitalisation was obtained at three intervals: end-September 2000, end-March 2001 and end-September 2001. To build the control portfolios, companies were ranked in descending order of market capitalisation at each of the three dates. The 40 shares with the largest market capitalisation constituted the large capitalisation portfolio. This replicated the JSE's ALSI40 Index, which is made up of the bourse's 40 largest shares by market value. The remaining shares comprised the small capitalisation portfolio.

Whether a company was regarded as a value or growth investment was determined by its price-to-book ratio. Price-to-book ratios were obtained from the McGregor BFA database for the 2000 and 2001 financial years for each company. Companies were then ranked in descending order according to their price-to-book ratios. The median price-to-book was calculated. All companies with price-to-book ratios above the median comprised the growth portfolio while those below the median were the value portfolio.

Broad JSE sector groupings were used as the criteria to decide whether a stock was a resource share or not. All mining and non-mining resources shares were classified as resources. The rest of the market was classified as non-resource.

Each share in the market was placed in one of these eight portfolios depending on its characteristics. Daily equal-weighted indices were constructed for each of the eight portfolios from the returns of all the stocks in that particular group.

The first set of portfolios was constructed on the working day before the first director transaction, namely 29 September 2000. Control portfolios were rebalanced monthly. Rebalancing assured that changes in share characteristics over time were closely tracked.