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The information content of directors' trades: empirical analysis of the Australian market

Abstract

We examine the trading activities of directors in shares of their own companies on the Australian Stock Exchange during the July-December 2005 period. We find that directors of small companies in particular earn abnormal return after both their 'Purchase' and their 'Sale' trade. Directors of these companies have an uncanny ability to time the market by trading when mispricing is greatest, and are able to predict the future performance of their firms in short run. For directors of medium and large companies, we find evidence that 'Sale' trades are the ones which work as loss avoiders. Outsiders recognise to some extent that directors' trades are informative, however they are slow to incorporate the new information into prices, refuting much of the market efficiency literature.

Keywords: asymmetric and private information, estimation.

JEL Classification: G34, D82, C13.

Introduction

Insider trading has been regulated in Australia under various Securities Industry Acts since 1970 and is an offence in the majority of the world's capital markets. Whilst insider trading typically has a negative connotation associated with it, this study does not attempt to give credence to whether insider trading is harmful, nor whether it should or should not be regulated. Rather, we examine whether insider trading is prevalent in the market, given the current regulatory structure in which it is prohibited. Thus, there are important public policy implications. It may indicate whether directors appear to blatantly disregard the law and whether the current regulatory structure is effective or they are law abiding citizens from trading perspective.

Well-known economist and Nobel Prize winner Milton Friedman (2003) aptly described this argument in his statement: "You want more insider trading, not less. You want to give the people most likely to have knowledge about deficiencies of the company an incentive to make the public aware of that". According to this reasoning, corporate collapses such as HIH and Enron would have been brought to the public's attention much sooner.

Manne (1966) argues that allowing insider trading is an effective means of compensating corporate agents for innovations. The entrepreneur can purchase the firm's shares before the innovation is announced to the market and sell the shares after the resultant price increase. This forms an effective compensation scheme whereby the compensation is

directly linked to the value of the innovation to the firm. Carlton and Fischel (1983) cite that this method is more effective than constant renegotiation of fixed contracts and allows the individual to tailor the compensation to the information he or she produces.

If directors' trades do contain information, then according to the semi-strong form of market efficiency, when the trade becomes public knowledge, this should be reflected in the share price. Outsiders should not be able to make abnormal profits from trading on this information. Seyhun (1986), and Rozeff and Zaman (1988) found results consistent with the semi-strong form of market efficiency. Bettis, Vickrey and Vickrey (1997) found that both insiders and outsiders can earn abnormal profits, net of transaction costs in the short and long term. This study has important market efficiency implications. If, as suggested, investors are able to earn abnormal profits from publicly available information, the market is not semi-strong form efficient.

We attempt to contribute to the some unresolved issues and to the lack of empirical research pertaining to Australia. We use directors' trading as a proxy for corporate insider information. Directors as corporate insiders have an intimate knowledge of the workings of a firm and have timely access to financial performance figures. Considering this as a back drop their predictability of the company's performance and the stock market response appears to be better at least in short term. We extend on Brown and Foo's (1997) research by examining the share price performance of companies surrounding registered directors' trades. If directors trade on the basis of information, which they and only they have and earn abnormal return in a relatively short span it is likely that their trades contain information. Thus, the general investors have a strong incentive to mimic the trading patterns of directors.

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With this in mind, the primary aim of this study is to answer the following questions:

1. Do directors earn abnormal returns from trades in their own companies?
2. Can investors mimic directors' trades and earn abnormal returns?

Importantly, our research is not only a test of insider trading, but also of market efficiency. Evidence of the ability to earn superior returns based on recorded corporate insider trades has implications for the efficiency of security markets. It is appropriate to determine the state of efficiency in regards to the Australian market, which, is nevertheless a by-product of examining information content of directors' trading.

1. Literature review

Finnerty (1976) has found that insiders earn above average returns when they buy securities of their respective organizations. On the sell side, his results indicated that the securities the insiders were selling fell more than the general market decline of the same period. From his study, it is apparent that in the short run insiders are able to identify profitable as well as loss avoidable situations in their own companies. Rogoff (1964) found that the returns to the insiders of these companies in the following 6 months were on average 9.5% higher than the return to the stock market as a whole. Jaffe (1974) reported that insiders do possess special information. However, after adjustment for transaction cost, only the intensive trading samples with 8-month holding periods were earning statistically large returns.

King and Roell (1988) found that a buy portfolio replicating 109 insider purchases produced an abnormal return of 2.47% after one month, and 53% after twelve months. The sell portfolio of 269 insider sales produced a 1.18% and 7.6% abnormal return respectively. Gregory et al. (1994) documented abnormal returns following insiders' trades. Cheuk, Fan and So (2006) reported that the Hong Kong insiders can make abnormal profits from both buying and selling activities. The magnitude of these abnormal profits associated with insider sales is considerably larger than that associated with insider purchases. Lorie and Neiderhoffer (1968), Jaffe (1976) and Finnerty (1976), among others, all adopt an intensive trading criterion and conclude that insiders in the U.S. do earn significant abnormal returns by trading on the securities of their own firms. Jaffe (1976, p. 428.), in particular, asserts that the occurrence of profitable insider transactions implies that "trading on inside information is widespread" and "insiders actually do violate security regulations".

In another study, Hillier and Marshall (2002) examined the abnormal share price returns of director trading, and report that on average directors outperformed the market and seemed to time their trade perfectly. Pope et al. (1990) using a slightly larger sample of 275 buy and 289 sell signals over the period of 1977-1984 found that for up to six months after the signal there were significant abnormal returns of 4.85% for the whole sample.

Some of the studies on insider trading have been undertaken on the basis of private information. Keown and Pinkerton (1981) provided evidence of excess returns earned prior to the first public disclosure of merger announcements. They cite that systematic abnormal returns can be interpreted as *prima facie* evidence of the market's reaction to information in advance of its public announcement. Similar findings have been observed in the lead up to dividend announcements (John and Lang, 1991), share repurchases (Lee, Mikkelsen et al., 1992), earnings announcements (Park, Jang et al., 1995), and takeovers (Meulbroek, 1992). Agarwal and Singh (2006) found existence of possible insider trading prior to merger announcements in Indian market.

Tomasic (1991) revealed that insider trading occurs predominantly in small speculative stocks and is likely to be undertaken by directors. Brown and Foo (1997) and Anand, Brown and Watson (2002) find that directors' selling transactions, not purchase transactions, are associated with abnormal returns.

2. Data

As required by the Corporations Law, directors must disclose any changes in their interests of the company to the ASX within five business days¹. Directors fulfil this requirement by completing an Appendix 3Y, which is then submitted to the ASX. After the information has been disclosed to the ASX, the full text of the announcement is made publicly available². Data were collected from DatAnalysis for all changes in directors' holdings reported to the ASX during the six-months from July to December 2005. Information was obtained from the original disclosure notices regarding the type of trade, volume of the transaction, nature of the interest, date of the transaction, and the date of disclosure. Our study does include trades by immediate family members of directors, which were disclosed to the ASX.

¹ Gettler's (2005) commercial research finds notification breaches by 62% of the largest 200 listed companies.

² The trade of directors of all the companies listed on ASX are even published by The Age newspaper on every weekend.

Transactions were removed from the sample if (I) more than one transaction type was stated in the change of director's interest notice, but the number of shares was indistinguishable between the two types, (II) the trade involved an amendment in subsequent disclosures, and (III) the trade specifically disclosed the reason for the change in holdings. In cases where no date of change was reported, the date of change was taken to be the date of disclosure. Trades that extended over a period of time but were not disclosed separately were recorded as at the date of the first transaction.

To avoid double counting, where two or more trades by different directors involved the same parcel of indirectly held shares, all but one of the transactions were removed from the sample. That is, where two or more directors of the same company reported a change in holdings of the same amount on the same day, the nature of the interests was examined. If the nature of the interest was indirect for both directors, only one of the transactions was retained. Similarly, multiple trades on the same day by the same director of the same company were combined together to form a total change in holdings. Given that not all directors' trades are based on inside information, only on market transactions were included in the sample. Therefore, following types of trades: off market trades, dividend reinvestment schemes, conversions of options, share purchase plans and rights issues were removed from the sample. Likewise, to reduce the potential for including trades for reasons such as diversification or taxation, an intensive trading criterion was imposed. If a company's stock exhibits intensive trading in the same direction by directors, it is likely that the trades are information motivated. In order to be included, it was required that over the given sample period, four or more directors buy (sell) shares and no director takes an opposing action¹. This requirement is consistent with previous empirical research conducted by Lorie and Neiderhoffer (1968) and Jaffe (1976).

A survivorship criterion was imposed to only include companies that had available share price and volume data for the 160 days before and after the date of trade. Companies were also removed from the sample if they were suspended from trading at any time during the sample period. This was determined by examining the volume and price data for each firm. No adjustments have been made to account for thin trading and thus it may be a problem

¹ The intensive trading criteria could have been over a shorter period, such as one month, however, Lakonishok and Lee (2001) note that measures calculated over longer time horizons seem to have a somewhat greater predictive power. A shorter time period would result in many firms having no trades.

affecting many of the companies, especially in the case of smaller sub sample.

3. Research methodology

3.1. Abnormal return. The presence of insider trading may be inferred from the existence of abnormal returns – a practice that is generally accepted in the finance literature (Keown and Pinkerton, 1981). The stock price behavior surrounding directors' trades was examined using an event study method where the date of interest was the date of director's trade. To avoid misspecification arising from overlapping event periods, Lyon, Barber and Tsai (1999) methodology was used by purging the observations of overlapping returns. Thus, of the companies that experienced intensive trading, only one trade² was selected in order to calculate profitability of possible insider trading.

For each of the securities, daily rates of return were calculated³:

$$R_{i,t} = \ln(P_{i,t}) - \ln(P_{i,t-1}), \quad (1)$$

where $R_{i,t}$ – return of security i on day t ; $P_{i,t}$ and $P_{i,t-1}$ are the adjusted closing price for security i on day t and $t-1$ respectively.

Dimson and Marsh (1986) propose that the size effect can be overcome by constructing a set of diversified control portfolios for companies in different capitalization classes⁴.

$$AR_{i,t} = R_{i,t} - R_{Di,t} \quad (2)$$

where $AR_{i,t}$ – abnormal return of stock i on day t ; $R_{i,t}$ – price relative of stock i on day t ; $RD_{i,t}$ – price relative of equally weighted portfolio of stocks in the same size decile D as stock i on day t .

All companies listed on the ASX were ranked according to market capitalization as of September 28, 2006⁵ and divided into three separate control portfolios according to size: small, medium and large⁶. Daily returns for each portfolio were calculated by

² Selection was based on the trade of greatest volume and the date of change, so as to capture the date of the other trades in the surrounding event window.

³ We concentrate on daily rates of return rather than monthly because it facilitates a closer scrutiny of the impact of insider trading.

⁴ This method is preferable to the Capital Asset Pricing Model (CAPM) or a market model because it specifically accounts for firm size and is non-parametric in its approach. The use of this method is also consistent with Lin and Howe (1990).

⁵ Historical market capitalization data were unavailable for the event period windows.

⁶ Large companies were defined as Top 150 companies according to their market capitalisation; Medium companies are Top 500 companies excluding those in the Top 150; and Small companies are those outside the Top 500.

averaging the daily returns of the securities in the portfolio. This method is preferable to the Capital Asset Pricing Model (CAPM) or a market model because it specifically accounts for firm size and is non-parametric in its approach. The use of this method is also consistent with Lin and Howe (1990). The control portfolios, which include the sample firms, were constructed. The control portfolio reflects the buy and hold return that a naïve investor could have earned simply by investing in a well-diversified portfolio of stocks, of similar size, without any special information. There may be chances of contamination of control portfolio and sample firms, but the chances are very bleak in the case of medium and small firms as the proportion of sample firms is negligible in control firms.

Average abnormal returns were calculated cross-sectionally up to 160 (approximately 8 months) days before and after the date of trade¹:

$$AAR_t = \frac{\sum_{i=1}^n AR_{i,t}}{n}, \quad (3)$$

where AAR_t – average abnormal return on day t .

Further the cumulated average abnormal returns (CAR) for the purchases and sales sub samples were calculated:

$$CAR_{(t_1,t_2)} = \sum_{t=t_1}^{t_2} AAR_t, \quad (4)$$

where $CAR_{(t_1,t_2)}$ – cumulative average abnormal return over the period t_1 to t_2 .

3.2. Abnormal volume. In the market microstructure literature, high trading volumes are associated with the release and reception of information. Gao and Oler (2004) propose a method of calculating abnormal volume that accounts for firm specific and market wide factors:

$$AbnormalVolume_{i,t} = \frac{V_{i,t} - V_{i,normal}}{V_{i,normal}} - \frac{V_{D,t} - V_{D,normal}}{V_{D,normal}}, \quad (5)$$

where $V_{i,t}$ – volume of company i on day t ; $V_{i,normal}$ – average daily volume for firm i over estimation period; $V_{D,t}$ – average volume of equally weighted portfolio of stocks in the same size decile D as stock i on day t ; $V_{D,normal}$ – average volume of equally

weighted portfolio of stocks in same decile as stock i over the estimation period.

Average abnormal volume was calculated cross-sectionally for the 160 days before and after the date of trade:

$$AAV_t = \frac{\sum_{i=1}^n AV_{i,t}}{n}, \quad (6)$$

where AAV_t – cross-sectional average abnormal volume at time t ; $AV_{i,t}$ – abnormal volume of company i on day t .

4. Empirical results

4.1. Abnormal return. *4.1.1. Timing of directors' trades.* Stock price behavior surrounding directors' trades is displayed for both purchases and sales in Figure 1 for the 160 days before and after the date of trade. Figure 1 shows that from approximately 80 days before through to the day of the transaction, abnormal returns on purchases of directors' firms on average under perform the constructed portfolio. On the day of the buy transaction the abnormal returns on shares of the directors' companies begin to move upwards. Basel and Stein (1979) have given reason that purchases are more often driven by information or profit motive. Sale transactions generally exhibit the opposite pattern, it can be inferred that directors of these firms have ability to time their trade very well. Whilst the results for all trades appear to be straightforward, when stratified according to size these can be seen in Figures 2 to 4. Medium, small and large companies all exhibit that in sales trade after the event CAR started getting negative.

Purchases on the other hand, for all firms, do not generally exhibit that directors are trading on the base of some private; however pre-event abnormal returns of purchases by directors of small companies fluctuate around zero though post-event abnormal returns show a positive trend. The reason might be that these small firms are not heavily scrutinized by financial media or it may be just the small firms risk premium. Though pre-event abnormal returns are not necessary in illustrating the timing ability of the directors (Mitchell and Watson, 2004).

In directors' trades of medium companies, whilst directors' purchases do not seem profitable, the sales trade look like that they are timed favourably. Purchases by directors of large companies (Fig. 4) do not show any apparent trend. Abnormal returns are approximately the same over the pre- and post-trade periods. Sales by directors of large companies are showing loss avoiding timing ability.

¹ Pre-trade returns were examined because they can give significant insight into the reasons why directors trade and their ability to time the market.

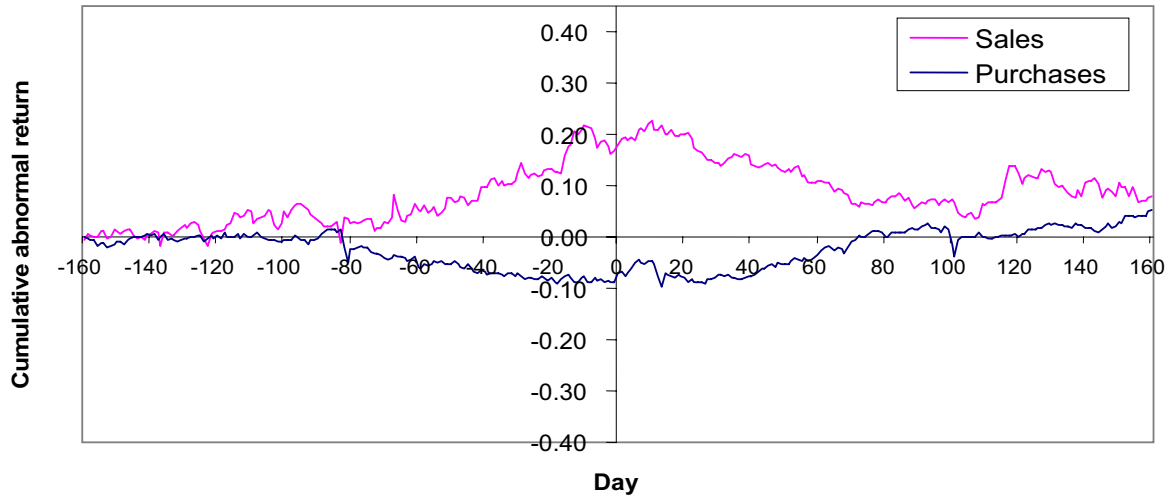


Fig. 1. 160 day pre- and post-trade cumulative abnormal returns all trades

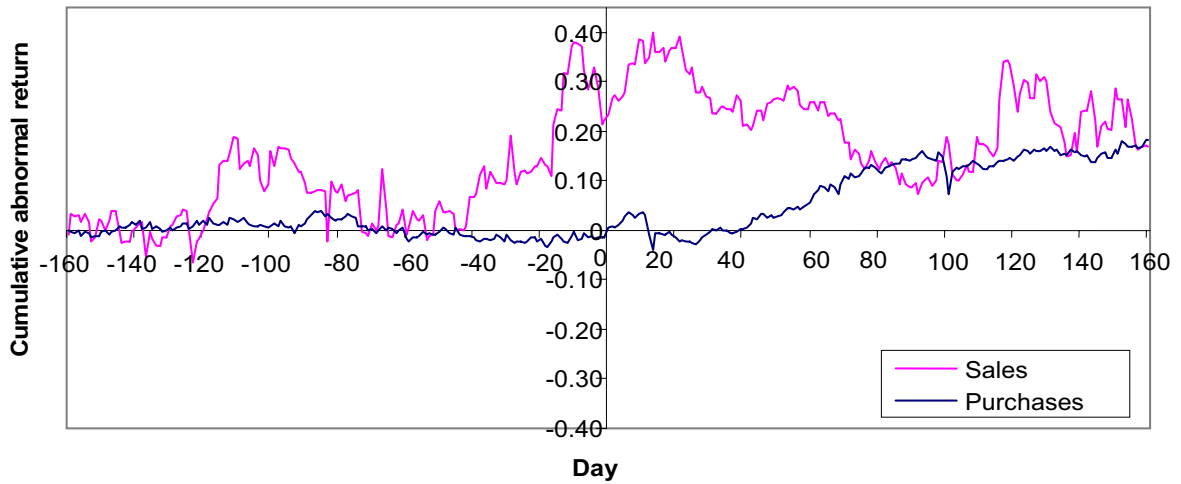


Fig. 2. 160 day pre and post-trade cumulative abnormal returns trades by directors of small companies

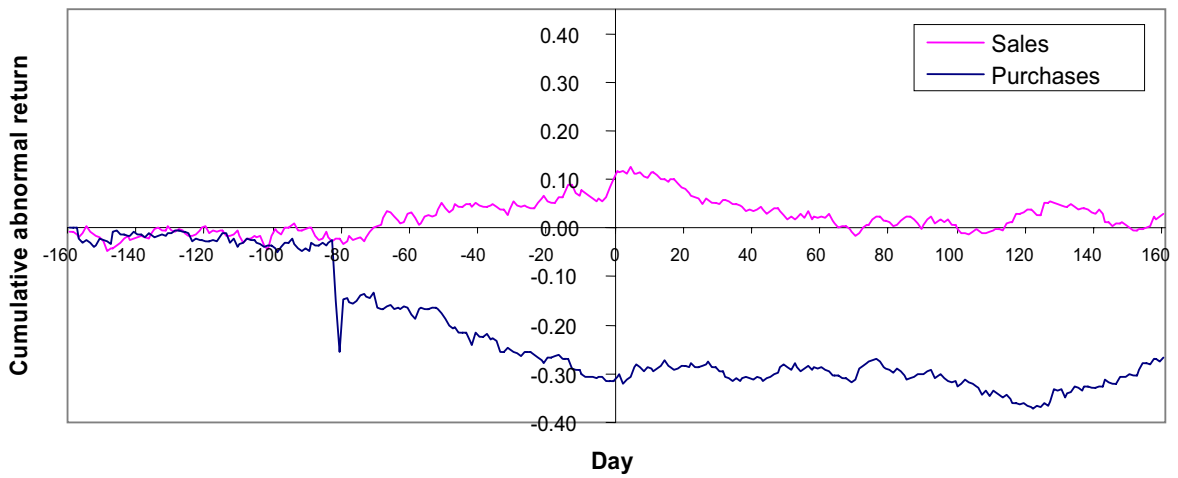


Fig. 3. 160 day pre and post-trade cumulative abnormal returns trades by directors of medium companies

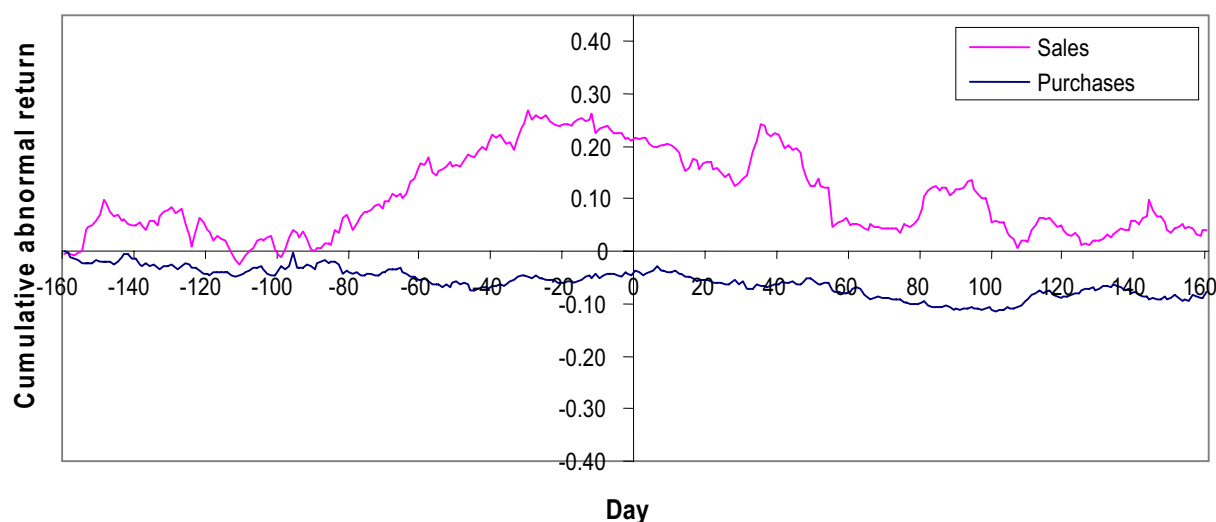


Fig. 4. 160 day pre and post-trade cumulative abnormal returns trades by directors of large companies

4.1.2. *Profitability in 160 day pre- and post-trade period.* Directors may earn abnormal returns if stock prices rise abnormally after their purchase trades or in a way if stock prices decline abnormally after

their sales. Negative post-trade profits of directors' sales are taken to be profits to directors in the sense that relative losses are avoided.

Table 1. 160 days pre- and post-trade cumulative abnormal returns

Event period CAR	Breakdown by company size			
	All	Small	Medium	Large
Panel A: CAR of purchase trades for 160 days before and after event				
[-160:0]	-0.072**	0.004	-0.306**	-0.0381**
[+1:+160]	0.125*	0.1788**	0.0406*	-0.0386*
Panel B: CAR of sales trades for 160 days before and after event				
[-160:0]	0.1808***	0.2323***	0.1185***	0.2156**
[+1:+160]	-0.1020**	-0.064	-0.0882***	-0.1755**

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%.

When all trades are combined (see Table 1) purchases (12.5%) are more profitable than sales (10.20%) over the 160 days after the trade date. This finding is consistent with previous literature in the US and the UK. Interestingly, it contradicts the previous empirical research conducted in Australia. Again, this finding is inconsistent when stratified by company size. Purchases (17.88%) by directors of small companies are significantly more profitable than sales (6.41%). Trades of large and medium companies directors have shown that their sales transactions were timed to avoid losses. Our results are consistent with Givoly and Palmon (1985), who, report cumulative abnormal returns of approximately 8.6% for purchases and 11.53% for sales over the 240 days after the trade. Although trades by directors of small companies are consistently profitable, there is little evidence that profitability is inversely related to firm size. The substantial profitability of sales transactions by directors of large companies indicates that large companies are not

necessarily more efficiently priced or face greater scrutiny than their small company counterparts. Abnormal return in 160 days window might have been affected by other micro or macro issues, it's why we have looked into a relatively smaller window.

4.1.3. *Profitability in 90 day pre- and post-trade period.* Similar findings can be observed in Figure 5 over the 90-day period before and after the date of the director's trade.

From Panel A of Table 2 it appears that private information is evident in the market up to 90 days before the actual date of the directors' trades, but not over a longer horizon. On the sales side, except that of large companies, loss avoiding is of greater magnitude. Directors of small companies are in beneficial situation in both types of trades. Lakonishik and Lee (2001) highlighted that this segment of the market is often perceived to be less efficient. Sales trades' results indicate that bad news is incorporated into prices much sooner than good news.

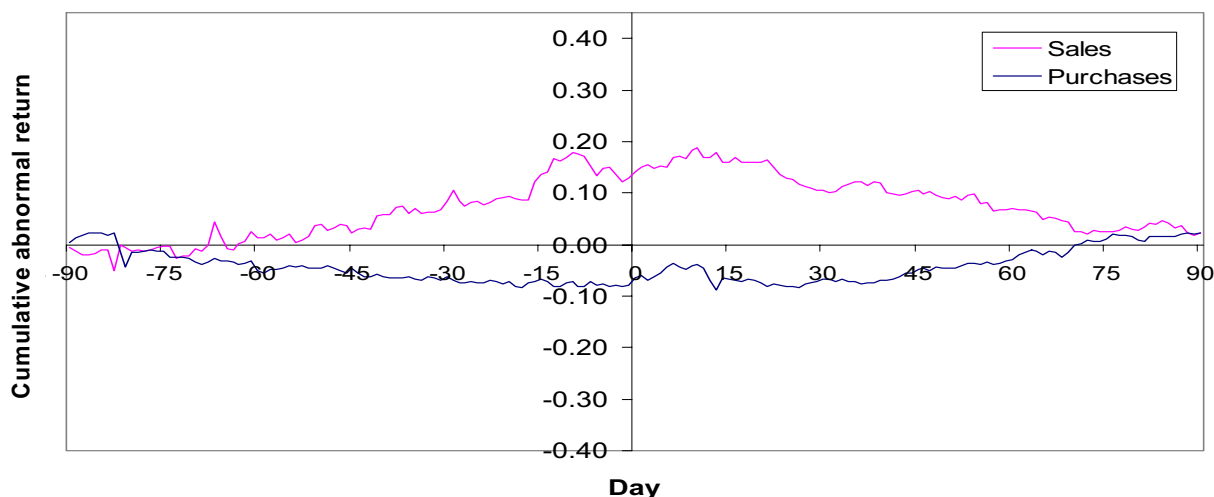


Fig. 5. 90 day pre and post-trade cumulative abnormal returns all trades

Table 2. 90 days pre- and post-trade cumulative abnormal returns

Event period CAR	Breakdown by company size			
	All	Small	Medium	Large
Panel A: CAR of purchase trades for 90 days before and after event				
[-90:0]	-0.0650**	-0.004	-0.2636**	-0.011
[+1:+90]	0.088**	0.1393**	-0.0067	-0.0715***
Panel B: CAR of sales trades for 90 days before and after event				
[-90:0]	0.1416**	0.1139	0.1220***	-0.2112***
[+1:+90]	-0.1197***	-0.1457*	-0.1125***	-0.097

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%.

4.1.4. Profitability in short term. Table 3 shows that the profitability of purchase trades in the short run does not appear to be statistically significant for any trades, except of medium companies, which have a cumulative abnormal return of 2.95%. In the case of large companies in post event window, CAR represents the loss avoiding trades, sales trades are exception for the small sub sample.

Table 3. 20 days pre- and post-trade cumulative abnormal returns

Event period CAR	Breakdown by company size			
	All	Small	Medium	Large
Panel A: CAR of purchase trades for 20 days before and after event				
[-20:-1]	-0.003	0.007	-0.0376*	0.0131*
[0:+20]	0.006	0.001	0.0295**	-0.008
Panel B: CAR of sales trades for 20 days before and after event				
[-20:-1]	0.037	0.092	0.0333*	-0.0290*
[0:+20]	0.0301**	0.1466***	-0.020	-0.0416*

Notes: *significant at 10%; **significant at 5%; ***significant at 1%.

Directors' trades have little explanatory power in predicting returns over a short horizon such as one month,

suggesting that directors are not likely to be day traders or fly by night operators. Hong, Lim and Stein (2000) have found that there is market under reaction to firm specific information particularly to bad news. The finding that directors' trades are profitable in the long run but not over a short horizon is again consistent with Givoly and Palmon (1985) and Lakonishok and Lee (2001). It is important to note that trading regulations differ between the two countries. The Securities and Exchange Commission (SEC) in the United States prohibits insiders from profiting on round-trip trades completed within a six-month period. Any profits made from such a transaction must be disgorged and returned to the corporation¹. No such regulation exists in Australia. One possible reason for this observation could be that directors are still wary about their legal obligations. If they were to trade based on a forthcoming event, this may subject them to unwanted scrutiny by ASIC. The presence of abnormal returns over a relatively longer time horizon and not over the short term also suggests that directors are not enticed to trade based on the forthcoming disclosure of a specific event (Givoly and Palmon, 1985).

¹ Section 16 (b) of the Securities and Exchange Act 1934.

4.1.5. Mimicking trades by outsiders. Given that directors do generally earn abnormal returns and time their trades, their trading contains a certain degree of information regarding the future long-term performance of the firm. Therefore, it would be expected that when the director discloses the change in their interest, this would be fully incorporated into share prices on the day of disclosure. So, as per semi-strong efficient market hypothesis, outsiders should not be able to earn any abnormal returns by mimicking directors' trades. Chan (2003) provides support that news is incorporated slowly in prices but argues that effect is driven by the slow reaction of prices to bad news. Specifically examining the abnormal returns earned in the post-disclosure period has tested this, the results of which can be seen in Table 4.

Table 4. Post-disclosure cumulative abnormal returns (CAR)

Event period CAR	Breakdown by company size			
	All	Small	Medium	Large
Panel A. Purchases				
[+5:+90]	0.0777**	0.1236**	0.007	-0.0695**
[+5:+160]	0.115	0.163	0.041	-0.037
Panel B. Sales*				
[+5:+90]	0.1317***	0.1826**	0.1187***	0.086
[+5:+160]	0.1140**	0.101	0.0944***	0.1640**

Notes: * Returns for directors' sales are converted to a "loss avoided" interpretation by multiplying them by -1.

It is apparent that in purchase trades, except of directors of small companies none other has much abnormal return in a period up to 90 days. The information contained in directors' trades should be reflected in the share price up to five trading days after the change in holdings, as required by law. Not all directors disclose their trades within this time period¹. The average time between date of change and date of disclosure is approximately five calendar days for all trades and does not differ according to firm size, assuming that on average directors do conform to their reporting requirements. Accordingly, for our sample, abnormal returns should not be evi-

dent starting five days after the date of the director's change in holdings. Outsiders mimicking the sales trade patterns of directors can still earn significant abnormal returns up to 13% and 11% respectively. In case of large companies it is as high as 16.4%. For sales, in order to mimic the trade the outsider must already own shares in the company. Alternatively, this could be interpreted as a signal of when not to purchase shares. Short selling is not a viable strategy for mimicking directors' sales, in that a short position must be settled within three days; however trades are only profitable over a relatively longer period of time. Seyhun (1997) finds profits to mimicking the large trades of insiders. The finding that abnormal returns are predictable to some extent has important market efficiency implications; abnormal returns can be earned by trading on publicly available information at least in the case of small companies.

Givoly and Palmon (1985) indicate that the mere occurrence of directors' trades, regardless of whether it is based on inside information or not, may generate abnormal returns. Since many investors closely watch directors' trades, their trading may trigger a wave of transactions in the same direction by outsiders. This in itself may generate the abnormal returns to insiders in the period following their trades.

4.2. Abnormal volume. As previously mentioned, abnormal volume provides further insight into the dissemination of directors' trades into the market and the trading patterns of both directors and outsiders. If outsiders follow the disclosure of directors' trades, it would be expected that volume would substantially increase on the day of disclosure. If this was the case, it would seem that outsiders do pay attention to the trading patterns of directors and they consider that directors' trades convey a certain degree of information.

Panel A of Table 5 indicates that abnormal volume for directors' purchase on average increase substantially on the day after the day zero. Panel B indicates that abnormal volume increases substantially on the day zero and a day after it in case of all trades as well as sales trades of small and medium companies. Apart from transactions by directors of large companies this is consistent when stratified according to company size, although reason for this finding is unclear.

¹ Depending on the nature of non-disclosure the ASX will take appropriate action usually requiring the company or director to disclose the reason for the non-disclosure and the steps in place to ensure future compliance. If the listed entity continues not meeting the requirements of listing rule 3.19A, the ASX will refer the matter to ASIC for further action under s205G of the Corporations Act 2001 (ASX 2005).

Table 5. Abnormal volume

Event day	Breakdown by company size			
	ALL	Small	Medium	Large
Panel A	Purchases			
(-160)	-0.206	-0.273	-0.087	-0.388
(-90)	-0.212	-0.273	0.006	-0.369
(-20)	0.107	-0.182	0.340	0.252
(-5)	-0.144	0.154	-0.039	1.109
(-3)	0.014	-0.003	0.380	-0.254
(:0)	0.203	0.310	0.401	0.638
(+1)	4.98***	5.445***	4.026***	2.204*
(+3)	0.501	0.247	0.425	-0.070
(+5)	-0.152	-0.018	-0.126	-0.023
(+20)	-0.441	-0.444	-0.358	-0.270
(+60)	-0.119	-0.171	-0.046	-0.195
(+90)	-0.319	-0.302	-0.342	-0.412
(+160)	0.227	0.448	-0.053	1.380
Panel B	Sales			
(-160)	-0.228	0.205	-0.784	0.348
(-90)	-0.365	-0.980	0.342	-0.583
(-20)	0.011	-0.368	0.632	-0.548
(-5)	0.556	2.398*	-0.492	-0.225
(-3)	0.635	1.891	0.253	-0.399
(:0)	2.195**	5.917***	0.715	-0.231
(+1)	7.917***	3.957***	16.091***	-0.571
(+3)	-0.181	-0.595	0.075	-0.488
(+5)	1.489	2.550**	1.597	-0.561
(+20)	-0.466	-0.700	-0.024	-0.688
(+60)	-0.299	-0.679	-0.594	0.522
(+90)	-0.495	-1.035	-0.345	0.269
(+160)	-0.484	-0.843	-0.533	-0.498

Notes: * significant at 10%; **significant at 5%; ***significant at 1% level.

In the period before and after the trade date, apart from the substantial increase immediately surrounding the date of the trade, abnormal volume appears to fluctuate approximately around zero. Directors' trades do not directly drive the substantial increase in volume. The volume starts to increase on the actual date of the director's trade and on the day following the trade.

Trading by informed outsiders may also explain the increase in volume prior to the trading by the directors in the case of sale trades of small companies. The directors may have expressed their intention to trade to other third parties who trade on this information before the directors do and who do not have to report. Intuitively this does not make much sense.

If directors were to inform others about their trading it would most likely be after the director has traded so as to maximize their own profits. An alternative explanation is that directors try to mask their trades by trading when the market is noisy and other uninformed investors are driving up volume. The finding that volume substantially increases on the day of trade for sales but not purchases indicates that directors are more likely to purchase shares in smaller denominations in an attempt to hide their probable informed trading as far as purchase trades are concerned. Given that directors on average disclose their trade five calendar days after the date of the actual trade¹, this indicates that outsiders do not drive the abnormal volume in reaction to the trade because they are as yet unaware of the change in interest.

Daniel, Hirshleifer et al. (2002) note that in providing information to investors, relevant information must be salient and easily processed; the form as well as the content are important and affect how well the information is absorbed. Investors may find the disclosure of directors' trades difficult to interpret. Not all trades are based on inside information and thus, investors must be able to discern the difference between trades in order to effectively mimic them promptly. Literature in Australia regarding effective trading strategies based on directors' trades is scarce, as are commercialized services that explicitly sell and interpret insider trading data. Investors may not know which trades to mimic and even whether this presents a profitable strategy. It is also evident however, that volume significantly increases on the day of average disclosure for sales. This is noteworthy because it signifies that outsiders do pay attention to the trading of directors and mimic their trading. It appears however, that even though outsiders recognize that directors' trades convey information, this is not fully incorporated into prices.

4.3. Interest in sales versus purchases. The observation that sales are generally more profitable than purchases is not new; however, the reason has previously never been explored. The studies by Brown & Foo (1997) & Givoly and Palmon (1985) observe this effect, however they do not provide an explanation extending beyond methodology limitations in the prior literature. Kahneman and Tversky's (1979) prospect theory describes how individuals evaluate losses and gains in respect to a given reference point. They contend that losses create more distress among investors than the happiness created by equivalent gains. As per Barberis and Huang (2001) degree of loss aversion depends on prior gains and

¹ See Gettler (2005) for contrary findings.

losses. A loss that comes after prior gains is less painful than usual because it is cushioned by those earlier gains. In regards to sales by directors, the loss aversion is not in relation to the foregone shares because they are traded as initially intended. Rather, the director is loss averse to the future loss of return that would occur if the directors were to hold onto the shares. Given the same expected variation in returns, a director is more likely to trade based on negative information rather than equivalent positive information. Loss aversion can also explain the descriptive statistics¹ whereby average trade size differs depending on the type of trade. Directors' trades display more urgency when faced with the possibility of a real loss and therefore they will trade in larger amounts. The substantial increase in volume on the day of disclosure for sales but not purchases indicates that outsiders are quick to update their beliefs in regards to potential losses, but they are slow to react to potential gains. Benartzi and Thaler (1995) discussed the implications of loss aversion for equity premium puzzles. Further, Grinblatt & Han (2005) argue that loss aversion can also help explain momentum. Specifically, past winners have excessive selling pressure and past losers are not shunned as quickly as they should be and this causes under reaction to public information.

Conclusions

We have examined the abnormal share price and volume performance surrounding directors' trades of intensive trading firms. Consistent with the majority of other studies we report that directors of small (in purchase and sale trades) and medium (mainly sales trades) companies on average outperform the market and seem to time their trades per-

fectly in a period of up to 90 days. Directors of these companies have an uncanny ability to time the market by trading when mispricing is greatest, and are able to predict the short-term future performance of their firms because of their exclusive position. Sales consistently exhibit 'timed the trade' element; positive abnormal returns are earned prior to the sale and negative returns after it. Knowledge of such price behaviours in directors' trades may be helpful in forming trading strategies in such stocks. The results indicate that the securities the directors were selling fell more than the general portfolio of similar sized companies.

Directors' trades are relatively profitable over the longer term i.e. in the following 90 or 160 days, rather than over a shorter horizon such as one month (20 days). Directors' trades do contain information regarding the future predictability of the firms' share price, especially in the case of directors of small companies. Outsiders recognize this and react to the disclosure of directors' sales, however the price is slow to adjust; abnormal returns exist well after the disclosure of the trade. Outsiders are able to profitably mimic the trading of directors' sales, and purchases made by directors of small companies. It is evident that outsiders do react to some information contained in directors' trades, especially for sales. Because of the difficulty involved in interpreting the disclosure made by a director however, investors are unable to discern quickly the supposed information contained in directors' trades. Lack of attention may also lead to investor credulity (Daniel, Hirshleifer and Teoh, 2002), where owing to limited computational capabilities agents do not adequately account for the incentives of others in manipulating and presenting information.

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¹ Due to space constraint, we have not provided the descriptive statistics. It is available on request from corresponding author.

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