Accepted Manuscript

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PII: S0927-538X(17)30289-5

DOI: <https://doi.org/10.1016/j.pacfin.2018.01.004>

Reference: PACFIN 992

To appear in: *Pacific-Basin Finance Journal*

Received date: 21 June 2017

Revised date: 2 December 2017

Accepted date: 15 January 2018

Please cite this article as: Dean Katselas , Insider trading in Australia: Contrarianism and future performance. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Pacfin(2017), <https://doi.org/10.1016/j.pacfin.2018.01.004>

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Insider Trading in Australia: Contrarianism and Future Performance

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Abstract:

This paper examines, within the Australian market, the extent to which legal insider trades are information driven, premised on a disconnect between the market's assessment of firm value, and that of more informed insiders. I address the notion that insiders, endowed with superior information about their firm, are contrarian, reflecting disagreement with the market's current perception of firm value, and also use this knowledge by trading in advance of future performance indicators not known to the market. I find that insiders, directors in particular, are contrarian traders; they buy when their firm is in the bottom tercile according to prior returns (losers), and sell if their firm is a prior winner. Further, this behaviour is exacerbated if the firm is a value (glamour) stock. Finally, I show that even after controlling for the aforementioned factors, directors engage in net buying prior to positive accounting performance changes in the subsequent and following 12 month periods.

Keywords: Insider trading, Australia, directors, future performance, contrarian

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Highlights

- Australian directors are contrarian traders.
- This contrarianism is particularly evident for large stocks.
- They also engage in net buying prior to positive accounting performance changes.
- Small stocks do not indicate information based directors' trading in Australia.

Insider Trading in Australia: Contrarianism and Future Performance

1. Introduction

The paper investigates the extent to which directors in Australia trade on their superior information, about their firms. It does so by examining whether directors are contrarian traders, indicative of a disconnect between the prevailing market price, and the insider's perception of fair value. In addition to examining this phenomenon in the context of insiders' disagreement with current market price, this paper also considers the prospect of directors using their intimate knowledge of their firms' operations, and thus how these may translate into future performance, as motivations for insider trade.

Although the literature provides ample evidence of insider trading in the context of both contrarianism and future performance within the United States, only limited research explores these phenomena within the Australian market. In the former setting, directors are found to be contrarian traders in their own firms (Rozeff and Zaman 1998; Lakonishok and Lee 2001; Piotroski and Roulstone 2005). This manifests in said insiders purchasing after stock return decreases, and/or selling following stock return increases. Further, this body of research also finds an association between valuation metrics such as the cash flow to price and book value to price, and concludes that directors tend to purchase (sell) their stock when undervalued (overvalued) (Rozeff and Raman 1998; Jenter 2005). Thus, they collectively provide evidence that insiders do trade in their own firms' stock when valuation indicators depart from their more informed perception of fair value. Australian evidence however, is mixed. Brown et al. (2003) fail to conclude that insiders are contrarian, instead finding that directors in Australia tend to be momentum traders. Uylangco *et al.* (2010) on the other hand, do provide support for U.S. findings in Australia. In light of conflicting Australian results, the present paper revisits the

insider contrarianism question, albeit doing so using methodological approaches consistent with notable U.S. research (Lakonishok and Lee 2001; Piotroski and Roulstone 2005).

Next, I examine whether insiders trade on their expectation of their firms' future performance. Again, given their private information regarding their firms' operations, insiders hold more precise expectations about future return and accounting performance, and prior literature indicates that they do trade in advance of performance realisations. In the United States, *Ke et al.* (2003) show that directors anticipate, and thus sell their firms' stock about three quarters before a break in a string of earnings increases. In an additional study, Piotroski and Roulstone (2005) motivate the future performance trading strategy by emphasising that stronger regulation governing insiders' dealings during their period of interest, and hence greater scrutiny of their trades, prompts insiders to shift from trading on informational advantage about current information, to future indicators. Therefore, unlike prior studies which address either contrarianism *or* future performance associations in isolation, they address both. They find that insider purchases are significantly associated with both contrarianism and future earnings performance, being future return on assets (ROA), and that this purchasing behaviour varies significantly by book-to-market ratio (BM). Thus, both contrarianism and future performance motives for insider trading, on the evidence presented by Piotroski and Roulstone (2005), are inextricably intertwined. Jiang and Zaman (2010) underscore this finding by showing that the association with future performance is not due to market expectations more generally.

Several Australian studies examine the link between directors' trades and future performance, however none do so in the context of future accounting performance. Chang and Watson (2015), like Uylangco *et al.* (2010), focus on the profitability of directors' trades in Australia. Chang and Watson (2015), however, extend that study by incorporating one-year ahead stock returns as a performance variable of interest, in the context of director

compensation and extant insider holdings, as insider trade motivations. Hodgson and Van Praag (2006) also investigate the relationship between directors' trades and future returns, including forthcoming earnings, but do so using accruals as directors' trade cues. In any case, no study exists which examines both contrarianism and future performance within Australia, in the spirit of Piotroski and Roulstone (2005) and Jiang and Zaman (2009). This study addresses this gap.

Why Australia is a fruitful and unique setting for insider trading research generally, is twofold. Firstly, all companies listed on the Australian Securities Exchange (ASX), in contrast to firms in the United States, are required under the ASX Continuous Disclosure Regime, to promptly disclose all price sensitive information to the market, under Chapter 3 of the ASX Listing Rules, on an ongoing basis.² Secondly, the characteristics of the two markets differ in terms of liquidity. In particular, the Australian market contains many small, illiquid stocks (Hodgson and Van Praag 2006). Although theory suggests that small firms are more prone to information asymmetry (Brown and Hillegeist 2007), lack of liquidity fails to provide adequate cover under which information based trades may go undetected. This setting should act as a deterrent to informed trading (Kyle 1985), thus reducing the observable impact of informed trading in financial research. In sum, the continuous disclosure regime in Australia, coupled with the dissimilar size and liquidity distribution of the market generally, relative to the United States, provides a sufficiently different setting in which to investigate the viability of information based insider trading, and the conditions under which it takes place.

Results indicate that although insider trades show insignificant association with subsequent abnormal returns in same direction as the trade, there is evidence that such trades are based on information in the Australian setting. Directors' trades in particular, present

² This includes changes in directors' holdings under 3.19A.

evidence of pervasive information based trading in Australia – not *illegal* insider trading predicated on private information trading around specific corporate news, but rather trading on insiders' perceived mispricing by the market. This notion is ultimately reinforced by subsequent performance revelations, with *ROA* changes presenting a positive relation with net insider trade direction. Whether this presents a concern to regulators is a matter for future discussion. Whatever the case, one simply cannot deny the value of information gleaned by observing the behaviour of insiders, particularly if these signals act as a buffer for market mispricing.

The remainder of the paper is structured as follows. Section 2 presents a discussion of the background literature examining the properties of insider trades, their association with returns, and develops hypotheses. Section 3 elaborates the data used in this study. Sections 4 and 5 present some preliminary analyses examining insider trades, announcement returns, and their predictability of future market returns, respectively. Section 6 examines the notion of contrarian trading by insiders, followed by their association with future accounting performance, in Section 7. Section 8 concludes.

2. Hypothesis Development

Research investigating legal insider trading has long addressed the possibility of short term profit taking by insiders, before transaction costs (e.g. Jaffe 1974; Seyhun 1986, Muelbroek 1992; Jeng, Metrick and Zeckhauser 2003; Foo and Watson 2003; Berkman et al. 2016). Early literature documents return patterns consistent with the direction of the trade, over various windows thereafter; providing evidence of information based trading (Jaffe 1974; Finnerty 1976; Seyhun 1986). More recent regulatory scrutiny, and the prevalence of trading policies which mandate or prohibit trading during high information asymmetry periods (Bettis et al. 2000), invariably reduces the attractiveness of trading in this fashion (Huddart et al. 2007;

Chang and Wee 2016), prompting research investigating insider trading within a broader valuation context. This literature suggests that insiders appear to trade as contrarians following both recent price run-ups and current valuation characteristics (Rozeff and Zaman 1998; Lakonishok and Lee 2001; Piotroski and Roulstone 2005). That is, given their intimate knowledge of firm fundamentals, insiders trade when market pricing departs from what they perceive as fair. In addition to current pricing dynamics, a further strand of literature indicates an association between insider trades, and future performance (Ke et al. 2003; Piotroski and Roulstone 2005; Hodgson and Van Praag 2006; Jiang and Zaman 2010; Chang and Watson 2015). Again, insiders' awareness of current operations and how they may translate into accounting performance in the future, provide an opportunity for information based trading over longer term horizons.

Evidence indicating the presence of contrarian trading by insiders is reasonably robust within the United States, but less so outside this market. In the former setting, Rozeff and Zaman (1998) find that insiders are more inclined to buy shares in value firms, and conversely sell glamour stocks. Jiang and Zaman (2010) interpret this being consistent with insiders buying shares with higher expected returns than currently perceived by the market (i.e. undervalued stocks), and selling firms where the market's expected return assessment is overvalued. Lakonishok and Lee (2001) provide further insight into the contrarianism notion by showing that their measure of net insider trading, the net purchase ratio (NPR), is inversely associated with holding period returns over various windows preceding the measurement month. That is, insiders generally, and directors in particular, tend to purchase shares in their firms following a period of decreased returns, and sell subsequent to increasing returns. Piotroski and Roulstone (2005) and Jenter (2005) provide similar conclusions, and show that insiders are net buyers in value (low book-to-market ratio) firms, and net sellers in glamour (high book-to-market) stocks. One exception to this within the United States is Jiang and

Zaman (2010), who reveal only weak evidence of contrarian trading by insiders of high information uncertainty firms.

Australian evidence on insider contrarian trading is scant, however a study by Brown, Foo and Watson (2003) fails to reject the null hypothesis of no contrarian trading by insiders, which is at odds with evidence from the United States. In fact, they show that despite their contrarian prediction, insiders appear to trade in the same direction as prior return movements in Australia. Conversely, Uylangco *et al.* (2010) conclude that directors do appear to transact on a contrarian basis in Australia. In this paper, I revisit the contrarianism hypothesis, albeit upon following more closely the prior methodology by Lakonishok and Lee (2001), and also Piotroski and Roulstone (2005). The Australian market is characterised by a large number of relatively small, illiquid stocks compared to the United States (Hodgson and Van Praag 2006). Although prior literature suggests that the weaker information environments commonly associated with small firms should present greater opportunity for insider profits, their relative illiquidity fails to provide sufficient cover in which to trade undetected. Further, the U.S. finding that directors are net buyers (sellers) in value (glamour) stocks per the book-to-market ratio (BM) (Lakonishok and Lee 2001; Piotroski and Roulstone 2005) provides an additional, important factor which may confound the association. Therefore, within this paper, I pose the following contrarian hypothesis, which shall be tested in the Australian market, with these considerations in mind:

H1a: Insider trades in Australia present evidence of contrarianism.

Further, the relative illiquidity of the Australian market, coupled with the prevalence of small firms relative to the United States, provides a less than ideal setting for information based trading. Hodgson and Van Praag (2006) find that incremental information provided by insider trades largely accrues to large firms, given the abundance of noise traders within which to less

conspicuously trade. I conjecture that this phenomenon should be present for contrarian driven trades, as a form of private information trading, and hypothesise that this phenomenon is concentrated among large firms:

H1b: The incidence of contrarian trading in Australia, by insiders, is concentrated among large firms.

The second component of the paper examines whether insiders trade on their knowledge of forward looking information, that is; do insiders trade on foreknowledge of future accounting performance? Hodgson and Van Praag (2006) provide an analysis of directors' trades in Australia, and their association with accruals, and find that directors buys, interacted with negative accruals, is associated with future (1 year ahead) earnings, for large firms. There is no evidence of this predictability where future abnormal returns are used as the forward-looking performance metric. Chang and Watson (2015) also provide insight into the relationship between directors' trades and future return performance, by focusing on the timing of trade disclosure. The ASX Listing Rules requires public disclosure of changes in directors' interests within five working days, however they show that 5.95% (309) trades over the period were associated with late disclosure. They hypothesise, and show, that delayed disclosure of directors' sales acts as a significant predictive indicator of lower future returns.

This paper examines the future performance question in Australia in the spirit of Piotroski and Roulstone (2005) and Jiang and Zaman (2010) within the United States, who both do so against the backdrop of contrarianism. Those studies show that *both* informed contrarianism and greater insight into future performance are associated with insider trades. The lack of Australian evidence suggestive of an association between insider trades and future

earnings performance (Chang and Watson 2015)³, in conjunction with extant U.S. evidence, provides the basis of the following hypothesis:

H2a: Insider trades in Australia lead future performance.

Again, given the relative illiquidity and greater prevalence of smaller firms within the Australian market relative to the U.S., this association is likely to be more pronounced for large firms:

H2b: The positive association between insider trades in Australia and future firm performance, is concentrated among large firms.

3. Data

Insider transaction data is collected from Morningstar's DatAnalysis Premium platform. This source provides a collation of insider transaction data for directors of listed Australian companies, per Appendix 3Y of the *ASX Listing Rules*, as well as those of large shareholders pursuant to Form 604 (Notice of change of interests of substantial holder) stipulated under Section 671B of the *Corporations Act 2001*. I initially use transactions by both parties in this paper for context, before focusing exclusively on directors' trades in addressing the paper's hypotheses. Further, the above dataset includes the insider's identity, the number and value of the shares transacted, the direction of the trade (buy or sell), as well as the transaction and public announcement dates. In line with prior research, I only draw upon open market buy and sell transactions.

³ Chang and Watson (2015) stated, that at the time of their study, "...there is no current Australian evidence that insider trades are also predictive of future earnings performance." (p. 186)

Daily returns data are collected from Compustat Global Security Daily, and additional firm characteristic and accounting data are collected from the Compustat Global Annual database. This yields 95,795 transactions between the calendar years 2003 and 2014 inclusive, of which 29,229 are director trades, and the remaining 66,567 are by large shareholders. An overview of the data is provided in Table 1. In addition to presenting an overall summary under ‘All firms’, the data is partitioned into three groups according to whether the firm’s market capitalisation falls below the 30th percentile (small), between the 30th and 70th percentiles (medium), and above the 70th percentile (large). Breakpoints are established monthly, based on the distribution of the Australian Securities Exchange (ASX).

[Insert Table 1 here]

In contrast to prior U.S. studies indicating a bias toward insider selling (Seyhun 1988; Lakonishok and Lee 2001), Australian data presents an overwhelming proportion of buy transactions relative to sells, with approximately two buys for every sell transaction across the entire sample. This is consistent with prior Australian research (Brown et al. 2003; Hodgson and Van Praag 2006; Uylangco *et al.* 2010; Chang and Watson 2015; Berkman et al. 2016), and is attributed to the lower reliance on stock based remuneration in Australia, relative to the United States. The preference toward buys applies to each size partition, with a more pronounced bias as one moves from large to small firms (1.72 to 1 to 3.63 to 1, respectively). Separate examination by party (i.e. director versus large shareholder trades), reveals an even greater tendency for buying versus selling on the part of directors than large shareholders, where 84% (24,520/29,299) of all director transactions being buys, relative to 62% (41,190/66,570) for large shareholders. Upon expressing insider transactions by value (Turnover and % Market Cap), however, the picture becomes a sell dominated picture, regardless of the party or firm size. As such, anecdotally at least, insider buys are conducted in greater numbers, but carrying a lower mean value per trade than presented for sell transactions.

Table 2 reports on the number of trades, turnover, and the percent of market capitalisation represented by insider transaction, by year. Notably, data is sparse before 2008 for directors' trades⁴. Beyond this point, trade value exhibits a markedly greater amount of variation than implied by trade numbers. For example, director sales for 2010 and 2011 amount to 377 and 361 mean transactions, respectively, per month. In terms of share value, the latter year represents 3 times that of the former, with only a marginal increase when expressed as a proportion of overall market capitalisation. This underscores the notion that directors in Australia trade more frequently on the buy side, but do so for a smaller quantity of shares than sale trades. This pattern persists, regardless of year.

[Insert Table 2 here]

To understand how insider transactions vary by line of business, I next present the same data, albeit separately by GICS Industry Group in Table 3 (i.e. the four digit GICS level). For directors only.⁵ Notably, the largest single proportion of both buy and sell transactions emanate from within the Materials GICS category, being predominantly mining companies excluding coal (7870/24352 and 1521/4709, or 32% for both buys and sells, respectively). Upon also considering the Energy category, which includes the refining and provision of gas, oil and other consumable fuels, 45% of all directors buy and sell transactions are conducted from within the extractive industries, which is similar to their proportion of the ASX by the number of firms. Herein illustrates further uniqueness of the Australian setting. The Australian market consists of a disproportionately large number of small, relatively illiquid mining companies, which comprise a large proportion of the ASX. Thus, as indicated by Hodgson and Van Praag (2006),

⁴ In particular, there are only 62 buy and 8 sell directors' transactions in the sample, prior to 2008. To test for the sensitivity of including these transactions, all analyses in this paper were subsequently performed upon their exclusion. All results remained unchanged.

⁵ Given the differing distributional properties between directors and large shareholder trades, and the fact that directors generally possess more private information than large shareholders (Lakonishok and Lee 2001), only directors' trades are presented here, for brevity.

this difference in the market capitalisation and stock liquidity distribution in Australia, relative to the United States, provides variation in the sample otherwise not available. As shown in Table 3 in the context of directors' trades, this is largely due to the industry composition of the Australian market.

[Insert Table 3 here]

Figure 1 presents two bar charts which summarise the extent of insider trade activity, by industry group. The first (Panel A), reflects the extent of insider buy and sell transactions executed by directors, expressed as a proportion of all insider transactions. Materials, which encompasses the 'Metals and Mining' industry, dwarfs the activity presented by the remaining groups, with just below 10 percent of all insider trades executed by directors within this industry group. Energy, which includes oil and gas exploration, refining and distribution, ranks second in terms of director transactions, representing about 4 percent of all insider transactions over the period. This is followed by Capital Goods, which includes construction, building products and machinery, at about 2.5 percent of all insider transactions. The overwhelming number of director buys relative to sells persists irrespective of industry group.

[Insert Figure 1 here]

Panel B presents an identical industry group breakdown, albeit for large shareholder transactions. Evidently, the rank order of groups is largely similar to directors' trades, although presenting greater overall activity by magnitude. Further, although there exists the same asymmetry toward buys, the proportion of buys to sells is less extreme than observed for directors' trades. Taking the data underlying Panels A and B together, insider trades in firms within the Materials industry group represent about 30 percent of all insider transactions, with Energy capturing a further 10 percent. Upon adding the proportion of insider trades from within Real Estate and Capital Goods; over 50 percent of insider transactions are concentrated in 4 of

24 GICS industry groups. Anecdotally, these groups encapsulate operations which present a high degree of information asymmetry (see Aslan *et al* (2011) for some industry evidence). However, the lack of literature elaborating the motivations behind insider trades at the industry level make it difficult to rule out alternative hypotheses, and is beyond the scope of this paper.

Before formally testing the paper's hypotheses developed in Section 2, I provide additional insight into the Australian setting by examining 1) the extent to which the market initially reacts to the announcement of an insiders' trade, and 2) whether such trades, in aggregate, lead medium term market returns. These are presented in Sections 4 and 5, respectively.

4. Announcement Period Returns

The extent to which an insider trade announcement contains new information, is an important question. Evidence thus far however, varies depending on the market examined, and to my knowledge, has not been directly examined within Australia. For example, Lakonishok and Lee (2001) show that in the U.S., the market appears indifferent to an insider trade announcement, by evidence of insignificant 5-day abnormal cumulative returns over the 5-day period following an announcement.⁶ Conversely, Fidrmuc *et al.* (2006), using a sample from the United Kingdom (U.K.), conclude that both purchase and sale announcements trigger an immediate and significant market reaction, with more weight attributed to purchase announcements. The greater emphasis placed on timely disclosure in Australia by virtue of its Continuous Disclosure Regime, coupled with empirical evidence of significant timely disclosure within 5 days of the transaction (Chang and Watson 2015), like the U.K. (Hillier

⁶ At the time of their sample (1975-1995), insider transactions were reported to the SEC by the 10th of the month following the transaction. Further, difficulty in identifying an exact reported date posed additional issues. They do find that the market reacts to the trade date rather than the announcement though. Conversely, my sample involves disclosure via the ASX *Continuous Disclosure Regime*, necessitating an announcement to the ASX within 5 days of the transaction.

and Marshall 2002), provides a tight setting for examination. I conduct this examination by estimating abnormal returns in the five days following an insider trade announcement, using the Fama and French (1996) 3-factor model, augmented with the Carhart (1997) momentum factor:

$$r_{it} - r_{ft} = \beta_0 + \beta_1(r_{mt} - r_{ft}) + \beta_2SMB_t + \beta_3HML_t + \beta_4UMD_t + \varepsilon_t \quad \text{Equation 1}$$

Where r_{it} is the return for announcement i , on day t , r_f is the risk-free rate proxy, being the 30-day Australian bank bill rate on day t , r_m is value weighted return on the Australian market on day t , and the factors SMB , HML and UMD are the factors calculated daily, per Fama and French (1996) (SMB and HML) and Carhart (1997) (UMD). The estimation period is the 100 days from $t-110$ to $t-10$, and CAR is established between $t=0$ and $t=4$.

Table 4 presents the results of announcement abnormal returns tests, presented overall, and separately by size and book-to-market partitions. The ‘All’ row reveals positive cumulative abnormal average returns (CAAR) for insider buys, amount to 0.62% and 0.34% for director and large shareholder trades, respectively, and are both statistically significant. An inverse reaction emerges for insider sells, with marginal negative CAARs of lesser significance. I next partition the sample into three size partitions and three book-to-market partitions. The size partitions are formed as follows. Small firms (S) are those with a market capitalisation below the 30th percentile, Medium (M) firms are those with a market capitalisation between the 30th and 70th percentile, and Large (L) firms, are those above the 70th market capitalisation percentile. Cut-offs are established according to the ASX market capitalisation distribution, on the day of the announcement. Book-to-market partitions are established on a similar basis (Low, Medium and High respectively), re-sorted according to market capitalisation daily, drawing upon the most recent annual book value of equity figure, from Compustat Global.

[Insert Table 4 here]

On the buy side of Table 4, CAAR values decrease monotonically as one moves from the small to the large partition, with a marked decrease in statistical significance for the large firm BTM partitions. For example, the CAAR for the Small group for the 5-days following announcements, is 1.37% (Patell $t = 10.79$), the Medium group CAAR is 0.59% (Patell $t = 7.47$), and the Large group CAAR is -1.07% (Patell $t = -2.17$). Evidently, the announcement effect is size dependent, but not book-to-market dependent. The relationship between size and CAAR sign is consistent with the findings of Lakonishok and Lee (2001), and also Seyhun (1986) and Pascutti (1986), although their results are statistically insignificant.⁷ A similar phenomenon is observed for large shareholder buys.⁸ Sell announcements are accompanied by CAAR results with negative signs, suggesting that the market perceives insider sales as a negative signal. Many of these results are nevertheless insignificant, and is therefore consistent with Fidrmuc *et al.* (2006) result on sales in the U.K. In the case of directors' sales, only the low and high BM partitions for large firms are notably significant, and there appears to be no predictable pattern for large shareholder sales.

5. Market Return Predictability and Aggregate Insider Trading

Despite less than encouraging evidence on the timing of insider transactions and future returns at the firm level (e.g. Brown *et al.* (2003) for Australian evidence), prior empirical research presents a significant association between aggregate insider trading (i.e. at the market level) and future market movements. Seyhun (1988) for example, finds that net insider trading at the aggregate level, shows a positive correlation with the market portfolio in the 2 months

⁷ The close proximity of the trade and reporting dates in Australia likely accounts for the significance of my results.

⁸ The negative CAAR following the announcement of insider buy transactions of large firms is unexpected. One possibility may be that the market perceives an announcement of a buy transaction in these (highly visible) firms as a signal that the firm is undervalued. Further exploration of this possibility is left as an opportunity for future research.

that follow. In other words, insiders increase purchases in their own firms before market increases, and increase sales before market decreases. Whether said insiders anticipate an aggregate market movement or not, Seyhun's (1988) conclusion points to insiders trading on their own firm's assessment of future performance, which in aggregate, predicts market movements. Lakonishok and Lee (2001) extend Seyhun (1988) by also testing for the presence of contrarian trading by insiders, suggesting that rather than trading on specific information items, insiders transact in their companies' shares when they believe the market fundamentally misprices its value. Net insider trading refers to a single measure which captures the insider buy/sell position at a point in time. A commonly used measure is the *Net Purchase Ratio* (NPR), defined as the number of buys, less the number of sells, divided by the total number of insider buys and sells (Lakonishok and Lee 2001), over a given period of interest. In line with prior literature, I calculate the NPR for a given month as aggregate buys less aggregate sells, divided by the total buys and sells, over the prior six calendar months. Although some prior studies construct measures based on each month's activity (e.g. Seyhun (1986), Seyhun (1988), and Seyhun (1992)), the overlapping NPR measure adds the benefit of a much larger number of observations.⁹

Figure 2 presents the time series of mean monthly NPRs over all sample firms, and the aggregate holding period return (HPR), over the following 12 months. Note that the HPR ($t+12$) series is constructed as the geometric mean monthly market return over the months $t=1$ to $t=12$. Firstly, Figure 2 presents evidence of a close relationship between mean monthly NPR and the HPR over the following 12 months, except during the 2007 – 2008 period; the financial crisis. A similar disconnect is found by both Lakonishok and Lee (2001) and Seyhun (1988) for the

⁹ By construction, the NPR provides a measure ranging from -1 (net sell), to 1 (net buy), where 0 denotes a neutral position, and is typically calculated using the number or value of insider transactions. It is used by Lakonishok and Lee (2001) under this label, and is quantitatively similar to measures used by Jiang and Zaman (2010) and Seyhun (1988). Other studies draw upon unidirectional measures, such as the number of buys relative to total insider transactions (Piotroski and Roulstone 2005), where a particular direction of trade is under investigation. In any case, the underlying construct captured, is similar.

October 1987 crash. In sum, Figure 2 provides visual evidence of the association between aggregate insider trading, and 12-month ahead market returns.

[Insert Figure 2 here]

Next, I continue to follow the approach taken by Lakonishok and Lee (2001), and test the extent to which the NPR, and prior returns, predict future market returns, controlling for simple contrarianism. In doing so, I form three portfolios according to size (small, medium, and large), re-sorted each month. Breakpoints are at the 30th and 70th percentiles, according to the distribution of the ASX. Thus, the following model is estimated using portfolio-month observations:

$$\prod_{k=t}^{t+T} (1 + r_k^i) - \prod_{k=t}^{t+T} (1 + r_k^f) = \alpha_0 + \alpha_1 NPR_t^i + \alpha_2 PRIOR24_t^i + \varepsilon_t^i \quad \text{Equation 2}$$

Where r_k^i and r_k^f represent the month t equally weighted return of portfolio i , and the monthly return on Australian 90-day bank accepted bill rate, respectively. NPR_t^i is the NPR based on the number of trades, over partition i , calculated at month t , $PRIOR24_t^i$ is the holding period return over the 24 months prior to month t , and ε_t^i is the residual term. T represents the future return period, with the specification in Equation 2 separately estimated over 6 and 12 months¹⁰, and t-statistics are based on Newey and West (1987), to address autocorrelation and heteroscedasticity in the residuals arising from the use of overlapping periods.

Table 5 presents the results upon estimating Equation 2. I report these according to the three size portfolios (large, medium and small) based on the 30th and 70th ASX breakpoint percentiles, as done previously. Additionally, the results are separately reported for large shareholder and directors' transactions, with α_1 capturing the association between the NPR and

¹⁰ A 3-month horizon was also examined, which yields identical results to 6-month returns.

future returns, and a_2 presenting the prior return effect. The results indicate a stark difference between transactions by large shareholders and directors, suggesting an absence in information based trading among large shareholders. All results using large shareholder trades as the basis for calculating the NPR, are insignificant. Aggregate directors' results in the rightmost two columns, provides evidence that directors in Australia do time their trades. This is consistent with Lakonishok and Lee's (2001) conclusion that directors' trades are more informative than those of large shareholders, given their direct role in decision making. The directors' results on a_2 , are negative and significant for all portfolios and horizons except for small firms over a 6-month horizon, indicating that low market returns follow high market returns. Upon controlling for a simple contrarian strategy in this way, the result on a_1 enables one to test the return predictability of directors' trades not attributable to prior returns. Notably, the NPR is significantly associated with 12-month, but not 6-month ahead returns. Namely, the overall results on a_1 for directors' trades is 0.20 ($p < 0.1$), providing evidence of future return predictability over a 12-month horizon. Examining the large portfolio results indicates a significant positive association (0.24, $p < 0.01$), while the medium portfolio results are only significant at the 10% level (0.21, $p < 0.1$). The NPR for the small portfolio is in fact negatively associated with 12-month ahead returns (-0.14, $p < 0.05$). While further empirical investigation is required to identify a behavioural reason for this phenomenon for small firms, it is reasonable at this juncture to conclude, consistent with my predictions and upon controlling for simple contrarianism, that directors' trades of large firms are positively associated with 12-month ahead returns. This relationship attenuates as one moves from the large to the small firm portfolio results.

[Insert Table 5 here]

6. Contrarianism and Directors' Trading

This section sheds further light on insider buy and sell timing by presenting stock returns according to NPR and firm characteristic sorts. First, I calculate holding period returns over various windows relative to the NPR month; +6m, +12m, +2y, +3y, reflecting returns from the NPR firm-month to the indicated number of months and years. Further, returns are calculated over corresponding windows, albeit prior to the NPR firm-month. Each observation is next allocated to one of ten deciles, according to its NPR.

Table 6 presents the decile means for each HPR window for directors' trades only, with the addition of NPR and characteristics of interest, below. The *Positive* and *Negative* columns contain the mean returns, according to whether the NPR is positive or negative. The returns are strikingly monotonic and decreasing as one moves from decile 1 to 10. For example, decile 1, which contains the lowest (most negative) NPR observations indicates a +6m HPR of 15.4%. This decile reflects the most extreme net sell firm-months. Conversely, decile 10, which includes the most extreme net buy observations¹¹, has a mean +6m HPR of 1.9%. Similar monotonicity is observed for the +12m, +2y and +3y returns. On this evidence, returns over the 6 months following the NPR calculation month, net insider sells are associated with higher returns than net buys. This pattern is similar when examining returns over the following 12 months, albeit with a greater magnitude of effect (30.7% for decile 1, decreasing near monotonically to 0.3% for decile 10). The *Positive* and *Negative* columns provide additional evidence of returns increasing to a greater extent following net insider selling, than net insider buying. Longer term windows (+2y and +3y) exhibit a similar monotonic trend.

[Insert Table 6 here]

¹¹ Like Lakonishok and Lee (2001), NPRs exhibit a bimodal distribution, with deciles 5 to 10 containing firm months with a NPR of 1. I therefore sort on NPR followed by BM, given the importance placed on BM and insider contrarian trading, in prior studies. This will be further elaborated in the next section.

The next portion of Table 6 contains the returns *prior* to the NPR months over 6 month, 12 month, 2 year and 3 year periods. Thus, they provide insight into the association between prior return performance, and insider trading behaviour. Prior returns show a relationship with the NPR deciles; higher prior returns are associated with net insider selling, and lower/negative prior returns are associated with net buying. This phenomenon persists irrespective of the length of time over which prior returns are calculated. The evidence implying contrarian insider behaviour is hard to deny; selling activity increases following significant return increases, and buy buying increases following negative or low returns. Even more surprising is the tendency for returns to continue in a momentum fashion (Titman and Martin 1993; Titman and Martin 2001), in spite of directors trading in the opposite direction. Figures 3 and 4 present this relationship graphically. Figure 3 clearly suggests that net director selling (Decile 1) is associated with prior 12 month returns of 36.1%, whereas net director buying (Decile 10) follows *negative* returns of 28.4% over 12 months. Confidence intervals (95%) have been added to each decile bar for context.

[Insert Figure 3 here]

[Insert Figure 4 here]

Figure 4 illustrates the association between NPR decile and the HPR over the subsequent 12 month period, with a similar monotonic decrease, as one moves from the extreme sell decile (NPR decile 1) to the extreme buy decile (NPR decile 10). While the notion of prior returns prompting directors to alter their holdings, relative to their own assessments of fair value, makes intuitive sense; the continuation of said returns beyond the HPR estimation period, does not. This evidence suggests that the market overlooks the information signals presented via directors' trades, particularly for large firms, in much the same way as Lakonishok and Lee (2001). Nevertheless, this does not rule out the association between prior positive returns and net buying on the part of managers; indicative of contrarian trading.

Table 7 elaborates further, by reporting *abnormal* returns over the next 12 months, 2 years, 3 years, in addition to the prior 12-month abnormal return. Abnormal returns are defined here to be the returns over the aforementioned time horizons, less that of the mean return value of the firm's size and book-to-market quintiles, for that month. To demonstrate the directional abnormal return properties according to the NPR, I also allocate each firm month observation into NPR quintiles. Further, these are also allocated to one of nine partitions according to the firm's market capitalisation and book-to-market ratio in that month. Each of the market capitalisation and book-to-market groups are ascertained as before; the 30th and 70th percentiles define the breakpoints delineating small (low), medium, and large (high), for size and book-to-market respectively.

[Insert Table 7 here]

Inspection of Table 7 provides additional evidence of what has been presented thus far; directors are contrarian traders in their own firms, and the returns prompting such trades continue subsequent to their transactions. This effect is particularly pronounced for firms in the large partition. For example, the difference in abnormal returns between the lowest and highest NPR partitions over subsequent 12 month period, for 'value' stocks (low BM), is 16.1% (9.1% - [-7%]). This is also associated with an abnormal return difference between the same NPR partitions over the prior 12 months, of 8.9% (2.9% - [-6%]). 'Growth' stocks within the large partition exhibit a similar pattern, except the difference in prior 12 month abnormal returns (AR-12m) is 14.7%. In sum, the relationship for the large partition is generally uniform; directors buy following abnormal prior (positive) stock returns, and sell after abnormal negative returns, with the centre NPR partition exhibiting abnormal returns in between these extremes. This provides evidence supportive of both H1a and H1b.

7. Disentangling Contrarian and Future Performance Motives

An important question however, remains unanswered; is this contrarian behaviour conditional on superior private information about future cash flow realisations? In addressing this, I draw upon Piotroski and Roulstone (2005) as the methodological basis for what follows. Building on the same empirical literature which provides evidence on contrarian trading by insiders (e.g. Seyhun, 1992; Rozeff and Zaman, 1998), Piotroski and Roulstone (2005) examine the likelihood of insider trades prior to return and cash flow innovations, conditional on the extent of perceived mispricing. They do so by allocating firms to one of five book-to-market quintiles, and gauging the extent to which insider transactions are associated with changes in future performance. I follow a similar methodology by testing the following:

$$\begin{aligned} NPR_{it} = & \alpha + \beta_1 AR_POS_{i,t+1} + \beta_2 ROA_POS_{i,t} + \beta_3 ROA_POS_{i,t+1} \\ & + \beta_4 BM1_{i,t} + \beta_5 BM2_{i,t} + \beta_6 BM4_{i,t} \\ & + \beta_7 BM5_{i,t} + \beta_8 HRET_{i,t} + \beta_9 LRET_{i,t} + \varepsilon_t \end{aligned} \quad \text{Equation 3}$$

Where AR_POS , ROA_POS , and ROA_POS_{t+1} are my three future performance measures, which each assume a value of 1 if the 12-month abnormal holding period return¹², change in ROA in the coming 12-month period¹³, and the change in ROA in the following 12-month period¹⁴, are positive, respectively. $BM1$, $BM2$, $BM4$ and $BM5$ are indicator variables assuming a value of 1 if the firm-month falls within that book-to-market ratio quintile. $HRET$ and $LRET$ are also indicator variables, this time assigned a value of 1 where the prior 12-month

¹² Calculated as the 12-month holding period return for firm i , following month t , less that of a benchmark portfolio constructed according to size and B/M. Nine portfolios are constructed for this purpose; three size by three B/M portfolios, delineated by tercile breakpoints.

¹³ I define this as $(ROA_{t-1} - ROA_t)/ROA_{t-1}$, where t denotes the fiscal year end (plus 3 months) falling in the 12-months from the sample month t .

¹⁴ I define this as $(ROA_t - ROA_{t+1})/ROA_t$, where $t+1$ is the fiscal year end (plus 3 months) falling in the 12-month period commencing a year after sample month t .

return is in the highest ('winner'), and the lowest ('loser') tercile, respectively. The intercept term in this specification has a similar interpretation to Piotroski and Roulstone (2005), however to facilitate a directional interpretation, I omit the BM3 and MRET variables from my specification, rather than BM5 and LRET. Thus the intercepts here represent the mean NPR for a firm which is neutral in terms of its BM ratio and prior returns; i.e. it has a BM ratio in the middle quintile, and its prior returns place it in the middle momentum tercile. Further, unlike Piotroski and Roulstone (2005), I define HRET and LRET according to prior, rather than contemporaneous returns. Thus, my intercept term also captures the mean NPR of a momentum neutral stock, as a means of disentangling the contrarianism effect triggered by recent stock return momentum, from valuation and future performance explanations.

Table 8 presents the results of estimating Equation 3, which I do according to the Fama and Macbeth (1973) approach.¹⁵ Column (1), which includes only the book-to-market (valuation), and momentum indicator variables, corroborates my findings thus far; directors of high prior return firms, present a stronger tendency to sell relative to all other partitions. For example, the intercept here (0.749, $t=25.42$) presents the mean NPR for the middle BM quintile (BM3), which is also in middle momentum tercile. The results on BM increase monotonically from BM1 (highest book-to-market quintile; glamour stocks) to BM5 (the value quintile), with BM4 and BM5 yielding positive results, and the latter being significant at the 5% level (0.07, $t = 2.24$). A glamour (BM1) firm which is also momentum neutral exhibits a mean NPR of 0.357, and lower still (by a magnitude of -0.084, $t = -3.35$) for a 'winner' stock. While BM4 doesn't present a statistical difference in NPR compared to BM3 (0.035, $t = 1.33$), the overall monotonic relation between the BM portfolios and NPR, coupled with a statistically greater

¹⁵ This is consistent with Piotroski and Roulstone (2005), who construct Fama and Macbeth (1973) results based on monthly regressions.

tendency for directors of ‘winner’ (‘loser’) stocks to exhibit net selling (purchasing) behaviour, provides further support for the contrarian hypothesis in the Australian setting.

[Insert Table 8 here]

Next, I introduce the future performance variables to the original specification to test their association with the NPR, per H2a. Column (2) presents the result on future abnormal returns, and in spite of intuitive appeal, and some empirical evidence that insider purchases precede abnormal returns (e.g. Seyhun (1988)), there appears to be no significant evidence of this phenomenon within my sample setting. Columns (3) and (4) however, which include indicator variables for a positive change in ROA in the forthcoming 12-month, and subsequent 12-month period respectively, are both positive and significantly associated with the NPR. ROA_POS_t , representing a positive ROA change result which falls in the 12-month period following the sample month, is associated with a NPR increase of 0.07 ($t=2.03$). Similar results are also present on all remaining variables. Firms in the ‘winner’ (high prior return) tercile are also associated with a decrease in the NPR of 0.092 ($t = -5.18$), and ‘loser’ (low prior return) stocks are associated with a higher mean NPR to the order of 0.089 ($t = 2.30$), relative to a momentum neutral firm. The results of the specification presented in Column 4, which substitutes ROA_POS_{t+1} for ROA_POS_t , obtains a slightly lower magnitude result (0.053), now significant at the 10% level. Finally, Column (5), a specification encompassing all variables, underscores the ROA change results, with results similar on all other variables except AR_POS_t , which is now significantly negative at the 10% level (-0.036 , $t = -1.92$).

In untabulated results, I interact AR_POS_t with both HRET and LRET, in an otherwise identical specification to that in Column 5 of Table 8, to test whether the negative abnormal return result is due to momentum reversal (Jegadeesh and Titman 2001). The interaction with HRET yields an estimate of -0.061 ($t = -2.10$), suggesting that a ‘winner’ tercile firm which

also sees positive abnormal returns following the month of NPR calculation, experiences even greater net selling activity than a momentum neutral firm, with an insignificant result on the $LRET$ interaction. ROA_POS_t yields a similar result as specification (5), however ROA_POS_{t+1} loses significance. Although this result should be considered as preliminary and interpreted with caution, it does provide some evidence of momentum reversal in spite of directors' trades, on the sell side.

Table 9 draws upon the extensive literature supporting the notion that large firms operate within a richer information environment than small firms (e.g. Bhushan 1989; Collins and Kothari 1989; Collins *et al* 1987), and that such firms within Australia provide sufficient liquidity for insider trading relative to small firms (H2b). The results for large firms are, with the exception of ROA_POS_t and $LRET$, significant, both statistically and economically. Further, the transition from $BM1$ to $BM5$ is monotonic, from a significant decrease in NPR for glamour ($BM1$) to a positive association for value ($BM5$) stocks. The negative and significant result on $HRET$ (-0.143 , $t = -7.38$) indicates that stocks in the winner tercile are associated with a lower average NPR to the tune of 0.143 . Thus, in any case, the fact that a firm is large does not preclude its directors from engaging in contrarian trading, in particular selling, when the firm is a winner stock. Directors of medium sized firms are more likely to buy their stock when either a forthcoming change in the coming year (0.036 , $t = 2.72$), or subsequent year (0.033 , $t = 2.57$), are positive. Unlike the result for large firms however, they are more likely to purchase stock in their firms in the event that their firm is a loser stock over the prior 12 months. The small stock results reveal little of significance for this partition, except that these firms exhibit more buying activity versus sells, relative to either large or medium firms.

[Insert Table 9 here]

Next, in an effort to distinguish between two insider categories identified in the literature, I contrast results the results upon estimating Equation 3 for directors and large shareholders, respectively. In particular, both Lin and Howe (1990) and Fidrmuc, Goergen and Renneboog (2005) provide evidence of an ‘information hierarchy’, suggesting that insiders which are closer to the firm potentially trade on more valuable information. Table 10 presents these results separately for both groups, with differences reported in the two right most columns. Notably, directors engage in a significantly greater degree of buying activity relative to large shareholders, as indicated by the difference in the intercept term (0.427, $t = 13.15$). Next, the two future performance results, ROA_POS_t and ROA_POS_{t+1} , provide strong evidence that directors trading behaviour differs from large shareholders, prior to future changes in accounting performance. While directors engage in more net buying prior to positive changes in ROA ($ROA_POS_t = 0.083$, $t = 2.20$, and $ROA_POS_{t+1} = 0.052$, $t = 2.00$ for one and two year ahead results respectively), large shareholders show no such relationship. A positive ROA change within the coming year, ROA_POS_t , is associated with a decrease in the NPR (-0.083), and significant at the 5% level. While I have no a priori explanation for the negative association found, the lack of positive association between the NPR and positive ROA change for this more remote category of insider, and indeed the positive difference on ROA_POS_t (0.177, $t = 3.23$), adds support to the notion that directors trade well in advance of positive performance changes, given their superior information endowment.

[Insert Table 10 here]

Interestingly, large shareholders do not appear to statistically differ from directors as contrarians following the returns of ‘winners’ (i.e. both engage in more selling following positive prior returns). Although the magnitude of the change in the NPR is approximately only 50% that of directors (-0.047 vs -0.092) for winner stocks, large shareholders are responsive to

prior returns by realising profits under such circumstances. There is however, no evidence that large shareholders increase purchasing/decrease selling behaviour after negative prior returns ($LRET = -0.001$, $t = -0.13$). Thus, large shareholders appear contrarian only as far as it results in reducing their existing holdings. Directors rather, exhibit contrarianism in either direction.

8. Conclusion

This paper investigates whether the trades of insiders provide informative signals about future returns, in the Australian market. Further, I assess the extent that insiders time their trades, in terms of their association with prior returns, and whether they precede future performance changes. As such, I depart from the conventional understanding of insider trading as merely trading around material information events, and broaden the definition to constitute trading based on a disconnect between market value, and insiders' assessment of true firm value, more generally. The latter, one could argue, falls outside the scope of Australian legislation relating to insider trading given that such behaviour is not necessarily predicated on identifiable specific information or future actions, but rather, on insiders' personal interpretation of collective information and its disconnect from current market value.

I firstly draw upon the methodology of Lakonishok and Lee (2001) and apply it to the Australian setting, thus allowing insight into abnormal returns immediately surrounding trades, and the extent to which collective insider trade predicts future market movements. Although net insider trading, measured via the NPR, predicts positive 12-month ahead market returns, particularly so for large firms, the relationship for directors' trades is negative. Further investigation reveals that a more negative NPR is associated with positive future returns, than found for more positive NPR firms. While this rules out the potential for using insider buys as a viable buy signal per a trading rule, subsequent analyses show that this phenomenon is largely

explained as momentum returns. Indeed, it appears that directors exhibit contrarian behaviour following ‘winner’ or ‘loser’ returns in their firms.

Next, I show that the NPR shows an association with future positive performance changes, per the ROA as a measure of interest per prior research (Piotroski and Roulstone 2005). This result is particularly striking for performance results falling within the forthcoming 12 month period, and medium sized firms; although large firms present a significant association in the following year. The actions of directors, who exhibit closer proximity to day to day operations relative to large shareholders, provide strong predictability of future positive accounting performance, even after controlling for the momentum effect. My analyses therefore provide preliminary evidence of directors’, in Australia, trading *a priori* on their own perception of firm mispricing, in the context of prior return and future accounting performance expectations. Such signals may provide valuable information to assist market participants in forming more accurate firm value estimates in Australia, which I leave as an opportunity for future research.

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Table 1
Overview of Data

This table presents a descriptive overview of the insider transaction data. *Trades* is the number of insider trades over the period 2003 – 2014, and *Proportion of Trades*, is the mean proportion of firms which experience an insider trade in a given month. *Average trades/firm* is the mean number of firms experiencing an insider transaction, divided by the total number of firms in a given month, *Turnover* indicates the insider trade value, in millions of dollars, and *% Market Cap* is the mean monthly *Turnover* divided by market capitalisation. The *Directors* columns present buy and sell summaries for directors' trades disclosed per Appendix 3Y of the ASX Listing Rules, and the *Large Shareholders* columns, for changes in substantial holdings (671B of the Corporations Act 2001). The *All* columns present these summaries across the entire dataset. In addition to presenting an overall summary under 'All firms', the data is partitioned into three groups according to whether the firm's market capitalisation falls below the 30th percentile (small), between the 30th and 70th percentiles (medium), and above the 70th percentile (large). Breakpoints are established monthly, based on the distribution of the ASX.

	<i>Directors</i>		<i>Large Shareholders</i>		<i>All</i>	
	<i>Buy</i>	<i>Sell</i>	<i>Buy</i>	<i>Sell</i>	<i>Buy</i>	<i>Sell</i>
<u><i>Small firms</i></u>						
<i>Trades</i>	6732	524	6762	3192	13494	3716
<i>Proportion of firms</i>	0.1388	0.0262	0.2113	0.1253	0.1751	0.0828
<i>Average trades/firm</i>	0.6583	0.6975	1.0066	0.8542	0.8325	0.7870
<i>Turnover (\$M)</i>	0.1262	0.1254	0.8322	2.4242	0.4792	1.4390
<i>% Market Cap.</i>	0.69	1.33	1.33	3.66	1.01	2.66
<u><i>Medium firms</i></u>						
<i>Trades</i>	8452	1813	14249	7435	22701	9248
<i>Proportion of firms</i>	0.2112	0.0925	0.3864	0.2918	0.3026	0.2064
<i>Average trades/firm</i>	0.7969	0.7774	2.0130	1.5058	1.4314	1.1937
<i>Turnover (\$M)</i>	0.1739	0.7694	5.4537	8.0277	2.9286	4.9170
<i>% Market Cap.</i>	0.39	1.22	1.19	1.63	0.80	1.46
<u><i>Large firms</i></u>						
<i>Trades</i>	9336	2372	20179	14750	29515	17122
<i>Proportion of firms</i>	0.1725	0.0976	0.3551	0.3259	0.2638	0.2167
<i>Average trades/firm</i>	1.3623	0.7474	3.4074	2.7593	2.3849	1.7971
<i>Turnover (\$M)</i>	0.6320	5.0093	90.7433	111.3490	45.6877	60.4909
<i>% Market Cap.</i>	0.43	0.84	1.09	1.13	0.76	0.99
<u><i>All firms</i></u>						
<i>Trades</i>	24520	4709	41190	25377	65710	30086
<i>Proportion of firms</i>	0.1731	0.0738	0.3176	0.2477	0.2464	0.1701
<i>Average trades/firm</i>	0.9432	0.7412	2.1423	1.7065	1.5512	1.2758
<i>Turnover (\$M)</i>	0.3146	2.1778	32.3431	40.6003	16.5544	23.4579
<i>% Market Cap.</i>	0.50	1.11	1.20	2.14	0.86	1.68

Table 2
Overview by Year

This table presents an annual descriptive overview of selected statistics of interest over the calendar years 2003 – 2014. *Trades* is the number of insider trades over the period, *Turnover* indicates the mean monthly insider trade value, in millions of dollars, and *% Market Cap* is the mean monthly *Turnover* divided by market capitalisation. The *Directors* columns present buy and sell summaries for directors' trades disclosed per Appendix 3Y of the ASX Listing Rules, and the *Large Shareholders* columns, for changes in substantial holdings (671B of the Corporations Act 2001). The *All* columns contain present these summaries across the entire dataset.

		<i>Directors</i>		<i>Large Shareholders</i>		<i>All</i>	
		<i>Buy</i>	<i>Sell</i>	<i>Buy</i>	<i>Sell</i>	<i>Buy</i>	<i>Sell</i>
2003	<i>Trades</i>	1	0	1147	957	1148	957
	<i>Turnover (\$M)</i>	0.0359	0	81.9906	82.1405	41.0133	82.1405
	<i>% Market Cap.</i>	0.12	0	0.98	0.99	0.55	0.99
2004	<i>Trades</i>	6	1	1159	882	1165	883
	<i>Turnover (\$M)</i>	0.1237	0.1289	88.7314	95.9998	44.4276	48.0644
	<i>% Market Cap.</i>	0.19	2.41	0.78	1.04	0.48	1.72
2005	<i>Trades</i>	17	1	1528	982	1545	983
	<i>Turnover (\$M)</i>	1.6048	23.7295	96.4979	115.1847	49.0513	69.4571
	<i>% Market Cap.</i>	0.42	0.32	1.03	1.32	0.72	0.82
2006	<i>Trades</i>	15	1	1731	1137	1746	1138
	<i>Turnover (\$M)</i>	0.1463	0.2322	85.0139	100.0988	42.5801	50.1655
	<i>% Market Cap.</i>	0.28	0.03	1.05	1.32	0.66	0.67
2007	<i>Trades</i>	23	5	2288	1589	2311	1594
	<i>Turnover (\$M)</i>	0.2750	0.5940	117.5009	157.1882	58.8879	78.8911
	<i>% Market Cap.</i>	0.46	0.64	2.18	2.01	1.32	1.33
2008	<i>Trades</i>	851	196	2237	1597	3088	1793
	<i>Turnover (\$M)</i>	0.2477	5.9034	85.0935	119.6584	42.6706	62.7809
	<i>% Market Cap.</i>	0.55	0.98	1.22	1.01	0.88	1.00
2009	<i>Trades</i>	1761	451	1489	1233	3250	1684
	<i>Turnover (\$M)</i>	0.5799	3.1148	128.0919	117.4128	64.3359	60.2638
	<i>% Market Cap.</i>	0.54	1.12	1.14	1.22	0.84	1.17
2010	<i>Trades</i>	1410	377	1787	1170	3197	1547
	<i>Turnover (\$M)</i>	1.0891	2.8204	78.1525	130.9553	39.6208	66.8879
	<i>% Market Cap.</i>	0.48	0.84	0.97	0.97	0.73	0.91
2011	<i>Trades</i>	1463	361	1961	1235	3424	1596
	<i>Turnover (\$M)</i>	0.9123	8.5557	70.3313	105.4846	35.6218	57.0201
	<i>% Market Cap.</i>	0.51	0.80	1.02	1.15	0.76	0.97

		<i>Directors</i>		<i>Large Shareholders</i>		<i>All</i>	
		<i>Buy</i>	<i>Sell</i>	<i>Buy</i>	<i>Sell</i>	<i>Buy</i>	<i>Sell</i>
<i>2012</i>	<i>Trades</i>	1283	372	1543	1367	2826	1739
	<i>Turnover (\$M)</i>	0.7836	2.1065	82.6573	96.1885	41.7204	49.1475
	<i>% Market Cap.</i>	0.57	0.64	0.97	0.91	0.77	0.78
<i>2013</i>	<i>Trades</i>	1285	306	1553	1331	2838	1637
	<i>Turnover (\$M)</i>	0.4284	5.2927	88.5505	104.3035	44.4894	54.7981
	<i>% Market Cap.</i>	0.55	0.52	0.89	0.75	0.72	0.64
<i>2014</i>	<i>Trades</i>	1229	299	1753	1273	2982	1572
	<i>Turnover (\$M)</i>	1.3814	2.6777	86.7991	111.2068	44.0903	56.9422
	<i>% Market Cap.</i>	0.49	0.88	0.86	0.83	0.67	0.86

Table 3
Overview of Data - By Industry Group (Directors)

This table presents selected descriptive statistics over the calendar years 2003 – 2014, separately for *Buy* and *Sell* transactions, by GICS industry group classification. *Trades* is the number of insider trades over the period, *Proportion of firms*, is the proportion of firms which experienced at least one directors' trade in a given month, and *Average trades/firm*, is the mean number of directors' trades in a given month, per firm in that industry group. *Turnover* indicates the mean monthly insider trade value, in millions of dollars, and *% Market Cap* is the mean monthly *Turnover* divided by market capitalisation. For brevity, this table only reports these statistics for directors' trades disclosed per Appendix 3Y of the ASX Listing Rules.

	<i>Buy</i>					<i>Sell</i>				
	<i>Trades</i>	<i>Proportion of firms</i>	<i>Average trades/firm</i>	<i>Turnover (\$M)</i>	<i>% Market Cap.</i>	<i>Trades</i>	<i>Proportion of firms</i>	<i>Average trades/firm</i>	<i>Turnover (\$M)</i>	<i>% Market Cap.</i>
<i>Automobiles & Components</i>	180	0.4899	1.2589	0.0522	0.00	9	0.1733	0.7405	0.0420	0.00
<i>Banks</i>	306	0.4862	0.6323	0.2577	0.01	94	0.4047	0.8753	2.7543	0.02
<i>Capital Goods</i>	2079	0.3734	1.6224	0.3222	0.01	266	0.1698	0.6618	1.5013	0.01
<i>Commercial & Professional Services</i>	896	0.4243	0.7658	0.1643	0.00	221	0.1608	0.7789	1.7849	0.01
<i>Consumer Durables & Apparel</i>	265	0.3290	0.6199	0.2573	0.01	50	0.1173	0.5907	2.1211	0.03
<i>Consumer Services</i>	361	0.3729	0.6197	3.1601	0.00	213	0.2024	0.8311	2.1405	0.01
<i>Diversified Financials</i>	1370	0.2717	0.9437	0.1743	0.00	250	0.1410	0.8356	1.5200	0.01
<i>Energy</i>	3194	0.3664	1.1815	0.3064	0.01	578	0.1243	1.0161	2.9970	0.01
<i>Food & Staples Retailing</i>	115	0.4656	0.6056	0.4467	0.01	26	0.3407	0.8169	1.5608	0.01
<i>Food, Beverage & Tobacco</i>	812	0.3285	0.9956	0.2119	0.00	114	0.1565	1.2610	0.6723	0.00
<i>Health Care Equipment & Services</i>	1091	0.4160	1.3677	0.3611	0.00	248	0.1723	1.1322	1.5612	0.01
<i>Household & Personal Products</i>	24	0.7000	0.4382	0.0222	0.00	5	0.2917	0.3182	0.5486	0.00
<i>Insurance</i>	835	0.6760	5.9446	0.0768	0.00	41	0.2905	0.7460	1.0327	0.00
<i>Materials</i>	7830	0.2671	0.6966	0.2711	0.00	1521	0.0931	0.8028	1.0682	0.01

	<i>Buy</i>					<i>Sell</i>				
	<i>Trades</i>	<i>Proportion of firms</i>	<i>Average trades/firm</i>	<i>Turnover (\$M)</i>	<i>% Market Cap.</i>	<i>Trades</i>	<i>Proportion of firms</i>	<i>Average trades/firm</i>	<i>Turnover (\$M)</i>	<i>% Market Cap.</i>
<i>Media</i>	491	0.3158	1.0852	0.3261	0.00	111	0.1293	0.9178	16.1602	0.00
<i>Pharmaceuticals, Biotech & Life Sciences</i>	823	0.3271	0.6283	0.1433	0.00	123	0.1205	0.7145	1.1356	0.01
<i>Real Estate</i>	1147	0.2927	0.6677	1.1232	0.00	194	0.1033	0.5517	11.8689	0.02
<i>Retailing</i>	669	0.4451	0.9568	0.8451	0.00	165	0.2121	0.6772	2.9212	0.01
<i>Semiconductors & Equipment</i>	46	0.6458	0.4480	0.0605	0.00	6	0.3125	0.5455	0.2596	0.00
<i>Software & Services</i>	658	0.2851	1.1402	0.1430	0.00	244	0.1838	1.1803	2.3440	0.01
<i>Technology Hardware & Equipment</i>	259	0.3255	0.6986	0.1278	0.00	16	0.0560	0.9855	1.1053	0.01
<i>Telecommunication Services</i>	347	0.3582	0.7145	0.3269	0.00	98	0.2275	0.5295	1.5715	0.01
<i>Transportation</i>	306	0.4242	0.6676	0.5660	0.00	44	0.1600	0.3806	2.2988	0.01
<i>Utilities</i>	428	0.4676	0.8640	0.1302	0.01	72	0.1583	0.5774	1.5135	0.01

Table 4
Abnormal returns around insider transaction announcements

This table report the results of tests of abnormal returns between $t=0$ and $t=4$, relative to the insider transaction date. CAAR is the cumulative average abnormal return over the 5-days of interest, estimated via the Fama-French (1996) 3-factor model, augmented with the Carhart (1997) momentum factor. All factors were constructed on a daily basis, using Australian data. The t columns provide t-statistics per (Patell 1976). In addition to overall results presented in the *All row*, transactions are allocated to partitions according to the underlying firm's size and book-to-market ratio. Small firms (S) are those with a market capitalisation below the 30th percentile, Medium (M) firms are those with a market capitalisation between the 30th and 70th percentile, and Large (L) firms, are those above the 70th market capitalisation percentile. Cut-offs are established according to the ASX market capitalisation distribution, on the day of the announcement. Book-to-market partitions are established on a similar basis (Low, Medium and High respectively), re-sorted according to market capitalisation daily. *** denotes significance at the 1%, ** the 5%, and * at the 10% levels.

		<i>Buy</i>						<i>Sell</i>					
		<i>Directors</i>			<i>Large Shareholders</i>			<i>Directors</i>			<i>Large Shareholders</i>		
		<i>n</i>	<i>CAAR</i>	<i>t</i>	<i>n</i>	<i>CAAR</i>	<i>t</i>	<i>n</i>	<i>CAAR</i>	<i>t</i>	<i>n</i>	<i>CAAR</i>	<i>t</i>
<i>Size</i>	<i>B/M</i>												
<i>All</i>	<i>All</i>	12105	0.0062***	10.85	26730	0.0034***	26.99	1819	-0.0051	-1.59	12537	-0.0047**	-2.07
<i>S</i>	<i>All</i>	4810	0.0137***	10.79	5683	0.0109***	33.95	280	-0.0031	-0.72	2349	-0.0027	-0.60
	<i>L</i>	1124	0.0120***	3.18	1305	0.0184***	8.57	100	0.0002	0.62	558	-0.0011	-1.23
	<i>M</i>	1660	0.0200***	10.32	1995	0.0111***	44.63	99	-0.0060	-1.25	750	0.0050***	-2.95
	<i>H</i>	2026	0.0094***	4.92	2383	0.0067***	5.24	81	-0.0039	-0.64	1041	-0.0092***	-2.50
<i>M</i>	<i>All</i>	5278	0.0059***	7.47	11275	0.0052***	11.21	949	-0.0037	-1.02	4763	-0.0036	-0.12
	<i>L</i>	1632	0.0026***	2.64	3763	0.0058***	6.10	473	-0.0089	-1.78	1511	0.0011	0.19
	<i>M</i>	2082	0.0065***	4.99	4737	0.0056***	7.04	368	0.0004	0.25	1902	-0.0024	-1.20
	<i>H</i>	1564	0.0085***	5.26	2775	0.0036***	6.29	108	0.0052	0.23	1350	-0.0107	-1.01
<i>L</i>	<i>All</i>	2017	-0.0107**	-2.17	9772	-0.0032***	-6.71	590	-0.0084	-0.99	5425	-0.0066***	-2.64
	<i>L</i>	656	-0.0056	-1.12	3484	-0.0002***	-6.22	362	-0.0104***	-2.62	1832	-0.0049***	-4.23
	<i>M</i>	965	-0.0138**	-1.98	4086	-0.0019***	-4.57	185	-0.0020	-0.51	2336	-0.0049	-1.37
	<i>H</i>	396	-0.0116	-0.37	2202	-0.0103	-0.08	43	-0.0188***	-2.87	1257	-0.0123	-1.57

Table 5
Monthly aggregate insider trading and market returns

This table presents the results upon estimating the following model, for the 6 and 12 months following the transaction month:

$$\prod_{k=t}^{t+T} (1 + r_k^i) - \prod_{k=t}^{t+T} (1 + r_k^f) = \alpha_0 + \alpha_1 NPR_t^i + \alpha_2 PRIOR24_t^i + \varepsilon_t^i$$

Where r_k^i and r_k^f represent the month t equally weighted return of portfolio i , and the monthly return on Australian 90-day bank accepted bill rate, respectively. NPR_t^i is the net purchase ratio over partition i , calculated in month t , $PRIOR24_t^i$ is the holding period return over the 24 months prior to month t , Portfolios are formed according to the three size partitions (large, medium and small) based on the 30th and 70th ASX breakpoint percentiles, as done previously. T-statistics are presented below in parentheses. *** denotes significance at the 1%, ** the 5%, and * at the 10% levels.

		<i>All</i>		<i>Large Shareholders</i>		<i>Directors</i>	
		a_1	a_2	a_1	a_2	a_1	a_2
All firms	6 months	-0.01	-0.02	0.21	-0.05	0.07	-0.05**
		(-0.06)	(-0.56)	(1.05)	(-0.90)	(1.12)	(-2.02)
	12 months	0.33*	-0.12	0.54	-0.09	0.20*	-0.09*
		(1.76)	(-1.45)	(1.29)	(-0.96)	(1.76)	(-1.73)
Large firms	6 months	0.07	-0.03	0.27	-0.05	0.07	-0.04***
		(0.79)	(-0.91)	(1.02)	(-0.96)	(1.40)	(-3.40)
	12 months	0.46*	-0.10	0.40	-0.04	0.24***	-0.09***
		(2.16)	(-1.35)	(0.77)	(-0.45)	(2.52)	(-3.90)
Medium firms	6 months	-0.00	-0.03	0.12	-0.04	0.03	-0.05*
		(-0.04)	(-0.66)	(0.75)	(-0.76)	(0.41)	(-1.78)
	12 months	0.32	-0.12*	0.30	-0.07	0.21*	-0.16**
		(1.65)	(-1.68)	(0.95)	(-0.78)	(1.67)	(-2.09)
Small firms	6 months	-0.07	-0.03	-0.02	-0.01	-0.08	-0.03
		(-1.19)	(-0.37)	(-0.21)	(-0.10)	(-1.51)	(-0.34)
	12 months	-0.04	-0.21*	0.09	-0.11	-0.14**	-0.23**
		(-0.27)	(-1.75)	(0.42)	(-1.04)	(-1.97)	(-2.22)

Table 6
Performance of portfolios based on insider trading

This table reports the return, and key statistic decile means for each HPR window for directors' trades only, with the addition of NPR and characteristics of interest, below. The first column indicates the return periods relative to the NPR calculation month, for return calculations, with the bottom portion of this column identifying additional measures of relevance. The columns labelled 1 to 10 present associated statistics by deciles formed according to the NPR. The *Positive* and *Negative* columns contain the mean returns, according to whether the NPR is positive or negative.

	1	2	3	4	5	6	7	8	9	10	Positive	Negative
+6m	15.4%	12.3%	12.6%	7.0%	8.6%	8.3%	6.5%	5.9%	4.5%	1.9%	6.9%	13.5%
+12m	30.7%	22.4%	25.0%	15.7%	18.6%	18.3%	12.5%	9.0%	5.7%	0.3%	13.2%	25.8%
+2y	59.7%	43.3%	42.7%	34.7%	36.0%	30.7%	15.8%	6.4%	-4.6%	-20.6%	17.6%	50.0%
+3y	92.6%	70.8%	62.4%	65.9%	58.4%	32.5%	7.4%	-9.3%	-28.4%	-52.3%	16.1%	83.2%
-6m	16.2%	11.4%	7.0%	11.3%	10.1%	7.5%	3.1%	-0.3%	-7.0%	-15.9%	1.8%	14.9%
-12m	36.1%	22.4%	17.3%	27.2%	20.9%	17.5%	5.6%	-2.8%	-13.3%	-28.4%	5.0%	32.3%
-2y	64.2%	47.6%	40.3%	54.9%	43.2%	27.8%	9.0%	-6.4%	-24.5%	-44.3%	11.5%	59.0%
-3y	94.4%	72.1%	65.0%	67.4%	56.7%	31.8%	7.8%	-9.1%	-28.6%	-52.5%	16.2%	84.8%
NPR	-0.99	-0.55	0.53	0.93	1.00	1.00	1.00	1.00	1.00	1.00	0.94	-0.85
Net \$	\$-4.73	\$-3.49	\$-0.03	\$0.57	\$0.81	\$1.63	\$2.53	\$0.60	\$0.34	\$0.25	\$0.87	\$-4.42
NetDR	-1.50%	-1.19%	0.11%	0.37%	0.34%	0.48%	0.49%	0.38%	0.37%	0.80%	0.42%	-1.42%
Mkt Cap	1009	2072	5124	2713	2817	4234	2112	1061	5939	225	2288	1434
BM	0.42	0.80	0.60	0.31	0.36	0.55	0.76	1.03	1.46	3.11	1.03	0.57
Firm years	2955	2217	2362	3008	3004	3036	3020	3012	3028	2962	23613	4991

Table 7
Performance of portfolios based on insider trading - BM and Size

This table reports abnormal returns over the next 12 months, 2 years, 3 years, in addition to the prior 12 month abnormal return, relative to the NPR month. Abnormal returns are calculated over the aforementioned time horizons, less that of the mean value of the firm's size and book-to-market quintiles, for that month. Firms are also allocated to NPR terciles, denoted by the columns 1, 2, and 3. Further, these are also allocated to one of nine partitions according to the firm's market capitalisation and book-to-market ratio in that month. Each of the market capitalisation and book-to-market groups are ascertained as previously; the 30th and 70th percentiles define the breakpoints delineating small (low), medium, and large (high), for size and book-to-market respectively.

		<i>L</i>			<i>M</i>			<i>S</i>			<i>All</i>		
		<i>1</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>2</i>	<i>3</i>
<i>H</i>	<i>AR+3m</i>	0.1%	-0.1%	-1.5%	2.3%	-1.3%	-1.5%	1.9%	3.9%	-0.6%	1.4%	0.2%	-1.3%
	<i>AR+6m</i>	2.3%	-1.5%	-3.8%	2.2%	-1.5%	-1.5%	2.6%	5.5%	-0.0%	2.3%	0.1%	-2.1%
	<i>AR+12m</i>	9.1%	-5.2%	-7.0%	0.8%	-2.8%	-1.3%	12.0%	3.4%	7.6%	5.7%	-2.0%	-2.0%
	<i>AR+2y</i>	18.1%	-13.8%	-14.8%	-0.6%	-5.1%	-0.4%	16.7%	-1.7%	4.4%	9.0%	-6.5%	-5.0%
	<i>AR-12m</i>	2.9%	-2.8%	-6.0%	-6.6%	-5.8%	-4.6%	-14.1%	-8.9%	-3.3%	-4.8%	-5.7%	-4.9%
	<i>Firm months</i>	368	653	945	519	1370	1148	206	589	412	1093	2612	2505
<i>M</i>	<i>AR+3m</i>	1.4%	-1.2%	-1.2%	3.4%	-0.2%	0.3%	-2.6%	0.9%	-2.3%	1.9%	-0.4%	-0.8%
	<i>AR+6m</i>	2.2%	-1.6%	-3.1%	7.5%	0.2%	-2.1%	-0.0%	0.9%	-3.4%	4.0%	-0.4%	-2.8%
	<i>AR+12m</i>	4.5%	-2.9%	-5.1%	9.1%	2.4%	-0.4%	8.1%	0.8%	2.6%	6.4%	0.2%	-3.2%
	<i>AR+2y</i>	9.4%	-3.6%	-9.9%	10.0%	-3.4%	-4.0%	10.3%	-5.4%	-0.2%	9.7%	-3.7%	-7.5%
	<i>AR-12m</i>	2.0%	-2.1%	-3.2%	5.7%	-4.3%	-0.3%	-6.5%	1.6%	-2.0%	2.9%	-2.8%	-2.2%
	<i>Firm months</i>	1832	1650	2980	1187	2140	1429	184	478	298	3203	4268	4707

		<i>L</i>			<i>M</i>			<i>S</i>			<i>All</i>		
		<i>1</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>2</i>	<i>3</i>
<i>L</i>	<i>AR+3m</i>	2.4%	-0.6%	-1.6%	1.6%	-1.5%	-4.9%	4.5%	-2.2%	3.8%	2.3%	-1.2%	-2.4%
	<i>AR+6m</i>	4.1%	1.3%	-3.8%	3.6%	-1.3%	-6.2%	4.6%	-3.2%	11.2%	4.0%	-0.3%	-3.7%
	<i>AR+12m</i>	7.6%	4.5%	-6.8%	3.0%	-2.1%	-9.6%	-0.9%	1.0%	11.4%	6.2%	0.9%	-6.6%
	<i>AR+2y</i>	14.8%	11.3%	-14.2%	8.5%	-0.0%	-9.9%	-6.7%	-3.5%	7.4%	12.6%	4.5%	-11.3%
	<i>AR-12m</i>	6.8%	1.8%	-7.9%	17.7%	5.6%	-1.3%	-5.0%	-3.0%	-5.5%	9.1%	3.4%	-5.6%
	<i>Firm months</i>	2988	1268	1613	984	1555	876	134	208	175	4106	3031	2664

Table 8
Regressions explaining the proportion of insider purchases by book-to-market quintiles, prior returns, and future performance

This table presents the results of estimating the following equation:

$$NPR_{it} = \alpha + \beta_1 AR_POS_{i,t+1} + \beta_2 ROA_POS_{i,t} + \beta_3 ROA_POS_{i,t+1} + \beta_4 BM1_{i,t} + \beta_5 BM2_{i,t} + \beta_6 BM4_{i,t} + \beta_7 BM5_{i,t} + \beta_8 HRET_{i,t} + \beta_9 LRET_{i,t} + \varepsilon_t$$

NPR is the net purchase ratio for firm *i*, calculated in month *t*, *AR_POS*, *ROA_POS*, and *ROA_POS_{t+1}* are my three future performance measures, which each assume a value of 1 if the 12-month abnormal holding period return, change in *ROA* in the coming 12-month period, and the change in *ROA* in the following 12-month period, are positive, respectively. *BM1*, *BM2*, *BM4* and *BM5* are indicator variables assuming a value of 1 if the firm-month falls within that Book-to-market ratio quintile. *HRET* and *LRET* are also indicator variables, this time assigned a value of 1 where the prior 12-month return is in the highest ('winner'), and the lowest ('loser') tercile, respectively. Results are based on the Fama and Macbeth (1973) method, and *t*-statistics are presented in parentheses. *** denotes significance at the 1%, ** the 5%, and * at the 10% levels.

	(1)	(2)	(3)	(4)	(5)
<i>Intercept</i>	0.749*** (25.42)	0.756*** (30.99)	0.646*** (19.97)	0.700*** (37.95)	0.646*** (16.81)
<i>AR_POS_t</i>		-0.047 (-1.32)			-0.036* (-1.92)
<i>ROA_POS_t</i>			0.070** (2.03)		0.083** (2.19)
<i>ROA_POS_{t+1}</i>				0.053* (1.81)	0.052** (1.99)
<i>BM1</i>	-0.392*** (-9.39)	-0.377*** (-8.67)	-0.244*** (-7.99)	-0.264*** (-12.55)	-0.234*** (-5.89)
<i>BM2</i>	-0.183*** (-5.26)	-0.145*** (-3.85)	-0.187*** (-3.17)	-0.261*** (-4.11)	-0.219*** (-3.59)
<i>BM4</i>	0.035 (1.33)	0.089*** (3.81)	0.119*** (2.93)	0.088*** (2.68)	0.117*** (2.82)
<i>BM5</i>	0.070** (2.24)	0.055 (1.50)	0.123*** (9.88)	0.121*** (5.30)	0.135*** (7.92)
<i>HRET</i>	-0.084*** (-3.35)	-0.084*** (-3.26)	-0.092*** (-5.18)	-0.149*** (-3.67)	-0.092*** (-5.08)
<i>LRET</i>	0.066*** (3.14)	0.068** (2.43)	0.089** (2.30)	0.068** (2.35)	0.095** (2.49)
<i>Adj. R²</i>	0.1620	0.1782	0.1517	0.1598	0.1687
<i>n</i>	30,152	30,152	22,828	22,828	22,828

Table 9

Regressions explaining the proportion of insider purchases by book-to-market quintiles, prior returns, and future performance – By size partitions

This table presents the results of estimating the following equation:

$$NPR_{it} = \alpha + \beta_1 AR_POS_{i,t+1} + \beta_2 ROA_POS_{i,t} + \beta_3 ROA_POS_{i,t+1} + \beta_4 BM1_{i,t} + \beta_5 BM2_{i,t} + \beta_6 BM4_{i,t} + \beta_7 BM5_{i,t} + \beta_8 HRET_{i,t} + \beta_9 LRET_{i,t} + \varepsilon_t$$

NPR is the net purchase ratio for firm *i*, calculated in month *t*, *AR_POS*, *ROA_POS*, and *ROA_POS_{t+1}* are my three future performance measures, which each assume a value of 1 if the 12-month abnormal holding period return, change in *ROA* in the coming 12-month period, and the change in *ROA* in the following 12-month period, are positive, respectively. *BM1*, *BM2*, *BM4* and *BM5* are indicator variables assuming a value of 1 if the firm-month falls within that Book-to-market ratio quintile. *HRET* and *LRET* are also indicator variables, this time assigned a value of 1 where the prior 12-month return is in the highest ('winner'), and the lowest ('loser') tercile, respectively. Large Firms are those with a market capitalisation above the 70th percentile, small firms are those with a market capitalisation below the 30th percentile, and medium firms are those between the 30th and 70th percentiles. Size breakpoints are determined according to the ASX distribution, in the *NPR* month. Results are based on the Fama and Macbeth (1973) method, and t-statistics are presented in parentheses. *** denotes significance at the 1%, ** the 5%, and * at the 10% levels.

	<i>Large Firms</i>		<i>Medium Firms</i>		<i>Small Firms</i>		<i>Small - Large</i>	
<i>Intercept</i>	0.734***	(19.19)	0.595***	(14.46)	0.876***	(15.53)	0.142***	(3.43)
<i>AR_POS_t</i>	-0.036*	(-1.81)	-0.021	(-1.08)	-0.054	(-1.61)	-0.018	(-1.10)
<i>ROA_POS_t</i>	-0.020	(-0.61)	0.036***	(2.72)	0.047	(1.14)	0.067	(1.29)
<i>ROA_POS_{t+1}</i>	0.037**	(2.16)	0.033**	(2.57)	-0.098	(-1.42)	-0.135**	(-2.04)
<i>BM1</i>	-0.340***	(-10.59)	-0.155***	(-5.41)	-0.004	(-0.06)	0.336***	(6.35)
<i>BM2</i>	-0.307***	(-5.46)	-0.040*	(-1.86)	-0.065	(-1.08)	0.242**	(2.53)
<i>BM4</i>	0.084**	(2.48)	0.023	(1.01)	-0.162**	(-2.44)	-0.246***	(-3.99)
<i>BM5</i>	0.126***	(6.64)	0.134***	(5.71)	-0.022	(-0.46)	-0.148***	(-4.10)
<i>HRET</i>	-0.143***	(-7.38)	-0.027	(-1.07)	-0.092	(-1.57)	0.051	(1.29)
<i>LRET</i>	0.043	(1.46)	0.062***	(3.67)	-0.080	(-1.35)	-0.123	(-1.44)
<i>Average R²</i>	0.2178		0.1240		0.3071			
<i>n</i>	11,707		9,074		1,963			

Table 10

Regressions explaining the proportion of insider purchases by book-to-market quintiles, prior returns, and future performance – By insider type

This table presents the results of estimating the following equation:

$$NPR_{it} = \alpha + \beta_1 AR_POS_{i,t+1} + \beta_2 ROA_POS_{i,t} + \beta_3 ROA_POS_{i,t+1} + \beta_4 BM1_{i,t} + \beta_5 BM2_{i,t} + \beta_6 BM4_{i,t} + \beta_7 BM5_{i,t} + \beta_8 HRET_{i,t} + \beta_9 LRET_{i,t} + \varepsilon_t$$

NPR is the net purchase ratio for firm *i*, calculated in month *t*, *AR_POS*, *ROA_POS*, and *ROA_POS*_{*t*+1} are my three future performance measures, which each assume a value of 1 if the 12-month abnormal holding period return, change in *ROA* in the coming 12-month period, and the change in *ROA* in the following 12-month period, are positive, respectively. *BM1*, *BM2*, *BM4* and *BM5* are indicator variables assuming a value of 1 if the firm-month falls within that Book-to-market ratio quintile. *HRET* and *LRET* are also indicator variables, this time assigned a value of 1 where the prior 12-month return is in the highest ('winner'), and the lowest ('loser') tercile, respectively. The *Directors* columns present the results for directors' trades, and the *Large Shareholders* columns report to results based on transactions undertaken by large shareholders only. Results are based on the Fama and Macbeth (1973) method, and *t*-statistics are presented in parentheses. *** denotes significance at the 1%, ** the 5%, and * at the 10% levels.

	<i>Directors</i>		<i>Large Shareholders</i>		<i>Difference</i>	
<i>Intercept</i>	0.646***	(16.92)	0.218***	(8.20)	0.427***	(13.15)
<i>AR_POS</i> _{<i>t</i>+1}	-0.036*	(-1.93)	-0.017	(-1.04)	-0.019	(-0.49)
<i>ROA_POS</i> _{<i>t</i>}	0.083**	(2.20)	-0.083**	(-2.04)	0.166***	(3.23)
<i>ROA_POS</i> _{<i>t</i>+1}	0.052**	(2.00)	0.004	(0.08)	0.048	(0.56)
<i>BM1</i>	-0.234***	(-5.93)	-0.034*	(-1.80)	-0.20***	(-4.82)
<i>BM2</i>	-0.219***	(-3.61)	-0.072**	(-2.15)	-0.147**	(-2.06)
<i>BM4</i>	0.117***	(2.84)	0.018	(0.43)	0.099**	(2.02)
<i>BM5</i>	0.135***	(7.97)	0.007	(0.17)	0.128***	(3.42)
<i>HRET</i>	-0.092***	(-5.12)	-0.047*	(-1.80)	-0.045	(-1.34)
<i>LRET</i>	0.095**	(2.50)	-0.001	(-0.13)	0.096**	(2.46)
<i>Average R</i> ²	0.1685		0.2128			
<i>n</i>	22,828		25,319			

A: Directors' Trades

B: Large Shareholders' Trades

Figure 1

Figure 2

Figure 3

Figure 4