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The Effect of Cross-Listing on Insider Trading Returns

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Holding privileged positions within firms, insiders can acquire excessive private benefits based on their informational advantage. The bonding hypothesis suggests that this can be prevented when a firm is cross-listed on an exchange with higher regulatory and legal costs compared to its home exchange. When cross-listed insiders buy and sell shares, the returns earned are lower than in domestic firms. This difference is due to the increased shareholder protection in cross-listed firms that constrains the extraction of private benefits, such that when cross-listed insiders trade, they trade for non-informational reasons.

1. Introduction

We examine the impact of the bonding hypothesis on Australian company insiders, in terms of the effect of cross-listing on the returns insiders earn when they trade in their own firm's shares. According to Coffee (1999, 2002) and Stulz (1999), the bonding hypothesis suggests that firms in countries with weaker investor protection can cross-list to markets with stricter regulation and better enforcement to signal their intent to improve investor protection. This improved investor protection results in increased stock returns post cross-listing and empirical support for the bonding hypothesis has been provided by Reese and Weisbach (2002), Doidge (2004) and Doidge, Karolyi and Stulz (2004),

The decision to cross-list and its resulting effects on the firm's shareholders has been extensively examined, though very few studies have considered the managerial perspectives or incentives involved with the decision to cross-list. In this paper, we investigate its impact on managerial incentives where reduced private benefits were expected after cross-listing due to the bonding impact. These private benefits acquired through insider trading are part of corporate governance and demonstrate the potential agency conflicts with outside shareholders. Abnormal returns from trading in one's firm's shares reflect the opportunity that controlling shareholders and managers have to extract private benefits at the expense of other shareholders. Firms on the other hand can only obtain external funding if they can ensure investors a return on their investment and discourage an environment where benefits can be extracted by these parties for their personal use (Karolyi, 2006). Coffee (1999, 2002) and Stulz (1999) suggest that managers can be "bonded" or constrained from taking excessive benefits by a firm's listing on an exchange with higher regulatory and legal costs, compared to its home exchange. These constraints can be direct in the

form of laws, disclosure and enforcement actions by the overseas exchange, regulatory bodies and the courts or indirect via increased scrutiny by analysts and the media. However because regulatory bonding is difficult to observe directly, it is necessary to investigate its effects. In this paper, the effect of bonding on insider trading returns where insiders in firms are bonded to a higher regulatory environment are examined and these returns are expected to be lower compared to returns in domestic firms.

Besides the decision to cross-list, the destination also appears to be an important factor in preventing the extraction of excessive benefits. Doidge, Karolyi and Stulz (2004) showed that firms with US cross-listings have higher valuations compared to non cross-listed firms and Roosenboom and van Dijk (2009) found that the destination market influences the creation of value around the cross-listing. The destination is also expected to affect insider trading returns where cross-listing to exchanges with better investor protection is expected to result in lower returns. However in a study of Canadian firms cross-listed on a US exchange, King and Segal (2004) reported that cross-listing may not provide equal benefits for all firms because only firms with active US trading experienced increased valuation. Korczak and Lasfer (2008) investigated UK firms cross-listed in the US and reported that: their trades were less informative compared to those in domestically listed firms, and the bonding effect was isolated to sell transactions only. The bonding hypothesis has been almost exclusively tested on cross-listing on US markets due to their reputation for the most stringent regulations and higher legal costs. However, skepticism over the effectiveness of enforcement over cross-listed firms on US markets exists (Siegel, 2005), which leaves the effectiveness of the bonding effect an open question.

Our sample consists of two types of firms listed on the Australian Securities Exchange (ASX): those with an additional listing on either the New York Stock Exchange (NYSE) or NASDAQ and those with only a domestic listing. The cross-list sample is limited to these two US markets because Beny's (2005) comparative analysis of insider trading laws in 33 countries ranked the US slightly above Australia in terms of overall regulation and enforcement. Although insider trading regulation and enforcement is a small part of overall regulation and enforcement and Siegel (2005) reported ineffective enforcement of regulation for foreign issuers, Doidge et al (2004) and Stulz (2004) showed that the additional investor protection afforded by US exchanges constrains the extraction of private benefits of control². Therefore, in this paper, we assume that when Australian firm cross-list on the NYSE or Nasdaq, they are subject to additional and higher regulatory and legal enforcement, as expected in the bonding hypothesis. As such, we compare the dual exposure of these cross-listed firms to the insider trading regulations of the US and Australia to domestic firms subject to Australian insider trading regulation only.

The results show that the likelihood of cross-listing increases with firm size and growth opportunities. Besides being significantly larger in terms of market capitalisation and total assets, cross-listed firms have similar performance to domestic firms but lower borrowings and more analysts coverage. The results support the bonding hypothesis where insiders in cross-listed firms earn lower returns from their trades compared to their counterparts in domestic firms, when they buy and sell shares. This is due to the better investor protection afforded to shareholders in cross-listed firms where because of the reduced incentives to trade as a result of lower information asymmetry, insiders trade only for non-information reasons. Cross-listing therefore

² These exchange listed firms are subject to SEC oversight and threat of US securities regulation, required to file Form 20-F and increase disclose in compliance with US GAAP (Korczak and Lasfer, 2008).

affects the trading behaviour of insiders which results in improved investor protection for the shareholders of the firm.

The remainder of the paper is organised as follows. Section 2 provides the literature review and hypothesis while the research method and data are discussed in Section 3. We present the results in Section 4 and the summary and conclusions in Section 5.

2. Theoretical background and hypothesis

Listings on US exchanges are generally linked to positive firm valuations (Foerster and Karolyi, 1999) and several explanations have been advanced for these gains. These include market segmentation, liquidity, information environment and investor protection. The market segmentation hypothesis suggests that cross-listing overcomes investment barriers between countries and thus results in reduced risk premium and cost of capital (Errunza and Losq, 1985) with Miller (1999) reporting higher returns for emerging market firms than firms from developed markets when they cross-listed on US markets. Firms that cross-list on more liquid and deeper markets also experience lower cost of capital (Foerster and Karolyi, 1998). A firm's information environment also changes with cross-listing where this resulted in increased media following, more analyst coverage, improved forecast accuracy and high accounting quality (Baker, Nofsinger and Weaver, 2002; Lang, Lins and Miller, 2003). Finally, the investor protection explanation argues that firms "bond" themselves via cross-listing on exchanges with higher standards of investor protection so that the interests of minority shareholders are protected (Coffee, 1999; Stulz, 1999)

Faff, Hodgson and Saudagaran (2002) investigated the cross-listing decision from Australia, a relative small market to larger international markets and reported that in general, these firms experienced a large drop in returns subsequent to listing. Another study on the Australian market also questioned the benefits of cross-listing where Ahmed, Kim and Henry (2006) reported no higher returns or reduced risk benefits from cross-listing in countries with better investor protection, or higher quality accounting reporting and disclosure. In addition, Durand, Gunawan and Tarca (2006) found no variation in the observed return patterns between different listing locations. Overall, these studies on the experience for Australian firms suggest limited benefits from cross-listing.

In this paper, we use the investor protection explanation via the bonding hypothesis to explain the effect on reduced managerial incentives, that is, returns from insider trading. The impact of cross-listing on the returns earned by the firm's insiders is considered from the perspective of improved investor protection or "bonding" the firm's management and controlling shareholders to stricter regulatory requirements. Coffee (1999) discussed the legal mechanisms of US listings to which firms are "bonded" and Stulz (1999) highlighted the role of "reputational intermediaries" existing in the US markets such as analysts, underwriters, debt-rating agencies, exchanges who provide extra monitoring (Karolyi, 2006). Empirically, there is support for the bonding hypothesis with Miller (1999) reporting higher announcement day returns for exchange listing compared to SEC Rule 144a private placements and OTC listings. Over the longer term, Foerster and Karolyi (1999) also report similar reactions. In terms of the decision to cross-list, Reese and Weisbach (2002) found that the legal systems from which firms originate influence

the probability of listing where firms from countries with weak legal protection tend to cross-list in the US. A cross-listing premium of 16%, measured by Tobin's q for firms from different countries with a US cross-listing was reported (Doidge et al., 2004)

The strength of the bonding hypothesis has been challenged. Licht (2003) asserted that the enforcement of stringent regulation is grossly overstated because the SEC was not an efficient enforcer of corporate governance rules for foreign issuers. In his assessment of the SEC's foreign firm enforcement policy, Siegel (2005) found only 25 cases of legal action against foreign firms since the enactment of the federal securities laws in 1933. He argued that foreign firms listed in the US are not equivalent US firms and can often acquire exemptions from some governance standards compulsory for US firms. According to LaPorta, Lopez-de-Silanes, Shleifer and Vishny (2002), cross-listing in New York could improve disclosure but not necessarily give minority shareholders many effective rights³. Some others that have questioned the benefits of bonding include Pinegar and Ravichandaran (2004), Bris, Cantale and Nishoitis (2007) and Gozzi, Levine and Schmuckler (2008). Specifically in terms of insider trading, the effectiveness of the bonding hypothesis is questioned because all firms cross-listed in the US are exempt from releasing information about director deals (Licht, 2003)

The effect on bonding on the controlling shareholders and insiders has largely been examined as an exogenous effect. On the contrary, insiders can influence the decision to cross-list. Doidge, Karolyi, Lins, Miller and Stulz (2009) showed that controlling shareholders are less likely to cross list in the US when private benefits are high due to the constraints on the consumption of

³ According to Brown and Tarca (2005), the Australian regulatory framework is similar to the US, UK and other developed markets, suggesting that the benefits from cross-listing, at least from the perspective of better investor protection, is limited.

such benefits after cross-listing. Charitou, Louca and Panayides (2008) questioned the legal aspect of the bonding hypothesis when they reported a relationship between cross-listing and CEO incentives to maximise private benefits. Hong and Huang (2005) advanced a similar argument about disclosure via investor relations where they identified one benefit to insiders as the increased liquidity of their shareholdings, in the event of a need to sell their shares. While cross-listing can reduce information asymmetry for the firm overall and decrease the opportunity for the extraction of private benefits for a small group of shareholders, it may improve the liquidity of the shareholdings for that same group. Therefore, while the costs of cross-listing are borne by all shareholders, insiders may disproportionately enjoy the benefits of increased liquidity.

A firm's cross-listing status is predicted to affect the trading behaviour of its insiders and the subsequent returns from trading due to the "legal and reputational bonding contracts" (Korczak and Lasfer, 2008) and the change in firm's information environment where cross-listing leads to lower information symmetry resulting from greater analyst following and disclosure. Insiders in cross-listed firms therefore trade less frequently and when they do trade, due to the lower information content of their trades, they are more likely to trade for non-information reasons. Korczak and Lasfer (2008) report that cross-listed directors trade less often and that their trading is less informative (with lower returns) than trading in domestically listed firms.

Insider trading studies on stock price performance around insider trades report positive abnormal returns after purchases and negative abnormal returns after sales (Jaffe, 1974; Seyhun, 1986; 1992; 1998). Seyhun (1986; 1998) also found that insider trades were more profitable in smaller

firms and when the insiders were part of top management. In more recent work, Lakonishok and Lee (2001) reported insider sales generally not to be informative though trades in small firms were more informative than those in large firms. Similar findings were reported in the UK (Gregory, Matatko and Tonks, 1997; Fidrmuc et al., 2006), Canada (Baesel and Stein, 1979), Germany (Betzer and Theissen, 2009) and Hong Kong (Wong, Cheung and Wu, 2000). Fidrmuc, et al. (2006) attributed variation in the market reaction to insider transactions to the various aspects of firm ownership including outside ownership, director ownership and types of outside ownership. In another paper, Fidrmuc, Korczak and Korczak (2010) examined insider purchases in 15 European countries and the US and found that the reaction to these trades was positively associated with country level shareholder protection.

In contrast, studies conducted using Australian data (see for example, Brown, Foo and Watson, 2003) have reported insider sales to be more informative than purchases. While there is general agreement that insider purchases signal the firm's favourable future prospects, the information associated with sales is less clear. Insider sales can signal negative information about the firm's prospects or alternatively are conducted for liquidity, rebalancing or diversification reasons, which are less informative. There are possible reasons for this inconsistency between Australian results and others. A possible explanation is the proportional difference in non-information trading by insiders, proposed by Hodgson and van Praag (2006). Remuneration differences exist between countries where for example in the US, executives receive a relatively higher proportion of their remuneration in options and share schemes than in Australia such that higher information content is predicted for sales. Fidrmuc et al. (2006) also provide a similar viewpoint when they reported a relation between market reaction to insider transactions and firm ownership. Another

reason is the composition of reported trades in different countries due to the various definitions of insider: that is, parties who required to report changes in their shareholding. In the US, corporate insiders are defined as a company's officers, directors and any beneficial owners of more than ten percent of a class of the company's equity securities (equivalent to substantial shareholders in Australia) while in Australia, the definition is restricted to company directors, being the parties who are required to disclose under s205G of the Corporations Act (2001). Therefore when insider trades are examined in Australia, the reasons for trading can be different to US insiders which also include substantial shareholders.

The bonding hypothesis is therefore expected to reduce the informativeness or information content of insider trades such that when insiders in cross-listed firms trade, the post trade returns are lower than in trades in domestic firms.

H1: Insider trades in cross-listed firms have less information content than those in domestic firms

Several determinants of insider trade profitability have been identified in previous research. An information hierarchy appears to exist with respect to the accessibility and timeliness of obtaining material information (Nunn, Madden and Gombola, 1983). It implies that the most profitable trades are those conducted by CEOs, given their informational advantage. However, the empirical evidence is not unequivocal on this contention. Nunn et al. (1983) confirmed that trading by CEOs is superior to other non-executive members of the board because of their ability

to better time their trades with price movements. On the contrary, Fildermuc et al (2006) reported that CEOs earn the lowest abnormal returns, compared to other board members.

Trade size is also expected to affect profitability. In a cross-sectional analysis of insider trading, Seyhun (1986) documented that the dollar value of the insider's trade is a significant factor in the trade's profitability. Insiders look to capitalise on more valuable information and trade larger amounts accordingly. Firm size can also influence profitability. Greater information asymmetry for smaller firms implies larger abnormal returns after intensive insider trading for smaller firms. Some US studies have found a significant negative relationship between firm size and insider trading profits (Seyhun, 1986; Lakonishok and Lee, 2001). However Lin and Howe (1990) reported an insignificant relationship. Australian studies have found that directors of smaller firms do not profit significantly from the informational asymmetry usually attributed to these insiders (Brown et al. 2003).

3. Data and Method

The initial sample consists of firms on the S&P/ASX300 between 2002 and 2007. Cross-listing information on these firms was obtained from Morningstar's (formerly Aspect Huntley) DatAnalysis and JP Morgan's ADR.com to identify those with at least a listing on the NYSE or NASDAQ. This process identified twelve cross-listed and 239 domestic firms.

The ASX's Listing Rules 3.19A and 3.19B and Section 205G of the Corporations Act form the framework for disclosure in listed entities of directors' interests in securities and transactions in these securities. Section 205G requires directors to notify of any change in their interests within

14 days while Listing Rule 3.19A necessitates the same disclosure within five working days. Directors' interest notices are reported to the ASX via lodgement through the Companies Announcements Platform (CAP). We obtained the data on changes in insiders' interests for our sample firms from DatAnalysis's ASX Signal G Announcements.

After trades were identified, the following requirements were used to retain trades in the final sample: the trade must be an on-market trade, the interest held by the director must be direct; the trade is not an initial or final change in shareholdings, the trade is not conducted during the blackout period (between the end of the financial year and the release of the earnings report) and the trade is informative where changes in shareholding based on stock option exercises, bonus issues and rights issues are excluded. These five requirements reduced the sample to 968 purchases and 621 sales, of which 54 purchases and 70 sales were conducted in cross-listed firms. Data on firm characteristics and analyst following were obtained from Aspect FinAnalysis and I/B/E/S respectively.

The standard event study methodology was applied where the event is the reported date of a change in an insider's interest⁴. Cumulative abnormal returns associated with these trades were measured as size-adjusted returns over five, 10, 50 and 125 days after the report date. Therefore, size adjusted return is estimated as:

$$SAR_{i,t} = AR_{i,t} - AR_{Si,t}$$

where $SAR_{i,t}$ is the cumulative size adjusted return of share i on day t , $AR_{i,t}$ is the ratio of the price of share i on day t relative to its price at the start of the period and $AR_{Si,t}$ is the price relative

⁴ Similar results were obtained when the event date was the trade date, the date the change in interest occurred.

for a control portfolio of shares of firms in the same size decile. This method of estimating returns was also applied in Lin and Howe (1990) and Brown et al. (2003). Returns are measured over five and 10 days to estimate the market reaction to the announcement of the change in shareholdings and over the longer period of 50 and 125 days to determine the valuation effects of the trade. These returns also illustrate whether an insider has correctly timed each trade where price increases are expected after purchases and price decreases (loss avoidance) following sales.

To assess the effect of cross-listing on insider trading returns, these post trade size adjusted returns over the [0: 50] and [0: 125] windows are regressed on the cross-list variable (*XLIST*) and other explanatory variables. The following model is estimated for purchases and sales individually:

$$SAR_i = \alpha + \beta XLIST_i + \delta Y_i + \varepsilon_i \quad (1)$$

Where *XLIST* is a dummy variable that takes on the value of 1 when the firm is cross-listed on the NYSE or NASDAQ and 0 otherwise and *Y* is a matrix of determinants of insider trading returns, including the trade size or value, position of the insider, the firm's market capitalisation and whether the firm belongs in the resource industry.

Doidge et al (2004) argued that a self selection bias may exist because the decision to cross-list may be affected by country specific and firm specific characteristics such as size and growth opportunities. Insider trading returns can be different in cross-listed firms due to the additional legal and regulatory oversight. In an OLS regression such as in Equation 1, the error term may be

correlated with whether the firm is cross-listed or not, leading to biased OLS estimates. In other words, the cross-listing variable is endogenously determined. We account for self selection like Doidge et al (2004) by running two stage least squares (2SLS) and two stage Heckman type procedures. Another related issue is the firm size effect where lower returns are associated with large firms due to lower information asymmetry in these firms (Banz, 1981). Larger firms are also more likely to cross-list. When the cross-listing variable (*XLIST*) is used to explain differences in returns between cross-listed and domestic firms due to the bonding hypothesis, it has to be attributed to the cross-listing status, rather than the size difference. That is, the size effect of cross-listing firms has to be disentangled from the cross-listing effect. We attempt to account for this effect by using size adjusted returns where the size effect is controlled so that it does not play a role in the abnormal returns measure.

The range of determinants of insider trading returns include trade size or value, position of the insider, the firm's market capitalisation and whether the firm belongs in the resource industry. The size of the parcel traded can be indicative of the information possessed by the trader or the confidence in such information such that a positive relationship is predicted between the size of the trade and abnormal returns. However, according to Barclay and Warner's (1993) stealth trading hypothesis, informed traders may try to conceal their activities by trading in smaller quantities. While Seyhun (1986) reported a positive relation between trade size and returns, Lin and Howe (1990) and Brown et al. (2003) were not able to show such an effect. We use three measures of trade size: number of shares traded, value of the parcel where the value of the parcel trade is estimated as the number of shares traded by the trade price and a relative size measure where the value of shares traded is deflated by the market value of equity.

The information hierarchy hypothesis suggests that informational advantage results from accessibility to information. Nunn et al. (1983) reported that CEOs had informational advantage over major shareholders and vice-presidents in timing their trades. Seyhun (1986) reported that executive directors earned higher returns and Lin and Howe (1990) also found support for the information hierarchy. However, Ravina and Sapeinza (2009) show that with purchases, independent directors make positive abnormal returns, the difference with executives being relatively small.

Market capitalisation was included because it is associated with information asymmetry. Seyhun (1998) and Lakonishok and Lee (2001) expected trades to be more profitable in smaller firms where greater information asymmetry is expected and hence greater profits. Seyhun (1986) found firm size to be negatively associated with abnormal returns although Lin and Howe (1990) and Brown et al. (2003) did not find such a result. Other studies include the industry effect but we only control for the resource industry due to the prevalence of firms involved in the resource industry in Australia and its associated information. Brown et al (2003) found insider sales in resource firms to be more profitable than those in non-resource firms.

Table 1 shows the characteristics of firms in the sample. The mean market capitalisation for domestic firms is \$1,206 million compared to \$513,933 million for cross-listed firms. Cross-listed firms are also larger than domestic firms in terms of total assets (\$18,070 million vs. \$1,951 million) with medians of \$689 million and \$351 million respectively. Although the average cross-listed is almost twelve and nine times larger than the average domestic firm in

market capitalisation and total asset terms, there is significantly more variation in size in the former. Firm performance, as measured by the return on assets show that cross-listed firms (mean of 5.7%) do not outperform domestic firms (mean of 4.5%) with the difference in mean being insignificant. Domestic firms have more debt to equity than cross-listed firms with mean values of 55% and 35% respectively. Consistent with previous research, cross-listed firms also have more analyst following and growth opportunities with domestic firms.

<Insert Table 1 here>

Table 2 describes the insider trades in the sample. There are 968 purchases and 621 sales, showing that insiders buy more frequently than they sell. However although sales occur less often, they are larger in terms of the number of shares traded in the parcel, the value of the parcel (estimated as number of shares multiplied by share price) and relative value.

<Insert Table 2 here>

A comparison of purchases between cross-listed and domestic insiders shows that the latter buy in larger parcels, both in terms of number of shares and value, although the relative value of their purchases is smaller than in cross-listed firms. However from the *t*-tests, these differences are not significant. The medians show that while domestic insiders buy a larger number of shares, the parcel value and relative value is high in cross-listed firms. The Wilcoxon test shows that only the difference in number of shares is significant at the 0.10 level. Higher share prices in the cross-listed firms compared to the domestic firms is the reason for the difference. In Australia,

insider trading policies are determined by the firms themselves and being an aspect of corporate governance, large firms are expected to have better governance systems. The larger relative mean and median values of the cross-listed purchases could indicate the restrictiveness of trading policies in these firms that limit the frequency of trading.

With their sales, domestic insiders also trade in larger parcels, in terms of number of shares and relative parcel value. The mean number of shares sold and the mean relative value of the parcel are 139,800 shares and 0.243% respectively (median values of 69,500 shares and 0.045%) compared to 41,820 shares and 0.007% in cross-listed firms respectively. However, the mean difference in value of parcel is not significant while the difference in medians is significant with domestic directors selling parcels of higher value. The significant difference in relative value for sales between cross-listed and domestic insiders could indicate information content because sales are conducted for information and non-information reasons and the size of the sale could be indicative of information content.

The post-trade returns associated with insider trades are presented in Table 3. Size-adjusted returns measured over five, 10, 50 and 125 days after the trade is reported are presented in Table 3 with purchases in Panel A and sales in Panel B.

<Insert Table 3 here>

The market reacts negatively to insider purchases in cross-listed firms where the returns over five and 10 days are negative, though only significant over the five day period. The median returns

are also negative, indicating that at least 50% of the market reaction was unfavourable. By comparison, the market reacts positively to purchases in domestic firms with returns in both windows being significant. Over the longer period of 50 and 125 days, the returns for cross-listed firms continued to be negative, indicating that these insiders encounter losses with their purchases. At least half of these insiders earn negative returns trades because the medians are also negative at -2.3% and -13% respectively. In contrast, the domestic directors earn positive returns of 1.6% and 5.4% over the 50 and 125 day period, of which the latter is statistically significant. The differences in means are statistically significant for the [0: 5] and [0: 125] returns while for the medians, all differences are significant except for the [0: 50] return.

With sales, the market reaction to cross-listed insiders' sales is positive over the five day period and negative over the 10 days period, both being insignificant. For domestic insiders, the returns are 0.3% and -0.1% respectively and also not significant. Over the longer period, the mean and median returns to domestic sales are negative, showing loss avoidance while for cross-listed insiders, the returns are positive. Unlike domestic insiders, cross-listed insiders fail to avoid future losses when they sell their shares. The *t*-test is significant at the 0.01 level for the [0: 50] return with the difference in medians also significant ($Z = -3.719$, $p < 0.01$).

This univariate analysis where returns have been adjusted for size shows that differences exist between cross-listed and domestic directors in the returns associated with their trades. Domestic insiders behave like other insiders in that they buy before a price increase and sell before a decrease. However, their cross-listed counterparts experience losses with their purchases and sales. With more than half the trades with returns in the direction opposite to that predicted, it

would appear that these trade maybe conducted for non-informational reasons. Insiders in cross-listed and domestic firms may have differing motivations and incentives for trading and these motivations may be reflected in the trade returns.

4. Results

Table 4 presents the analysis where the impact of cross-listing on insider returns is examined on purchases and sales separately. Results are presented for OLS, 2SLS and Heckman type regressions. As previously discussed, the OLS estimates maybe biased because the cross-listing variable is endogenously determined. To overcome this issue and consistent with previous work having the same prevailing problem (see Doidge et al. 2004; Korczak and Lasfer, 2008), we also present 2SLS and Heckman-type regressions. The likelihood of cross-listing is first estimated using a probit regression where the dependent variable is 1 for firms cross listed on US markets and 0 for domestic firms. The probit results show that cross-listed firms with insider purchases are larger than domestic firms while in firms with sales, these firms are also larger with better growth opportunities. This finding is consistent with Doidge et al.'s (2004) theory that firms with higher growth opportunities are more likely to cross-list. The likelihood of cross-listing is then used as an instrument in the 2SLS regression. The difference between the 2SLS and the Heckman type procedure is the inverse Mill's ratio in the latter. It is a selectivity term included in the second stage equation to correct for self-selection. In cases where the Mill's ratio is significant, the OLS estimates are biased and the Heckman estimation is more efficient.

In Panel A, there is no difference in 50 day returns between cross-listed and domestic insiders when they purchases shares for the OLS, 2SLS and Heckman regressions⁵. However, when returns are estimated over the longer period of 125 days, the *XLIST* coefficients on the OLS (-0.24, $p < 0.05$) and Heckman (-0.80, $p < 0.01$) are negative and significant. This shows that after taking into account size differences between firms using size-adjusted returns, the bonding hypothesis is supported because insiders in cross-listed firms earn lower returns when they buy shares, compared to domestic insiders. This result differs from Korczak and Lasfer (2008) where cross-listed insiders earned higher returns than domestic insiders when they bought shares. It is also important to account for self selection because the λ in the Heckman regression is positive and significant for the 125 day return window. Taken together with the univariate analysis, we know that the difference is due to losses sustained with cross-listed insider purchases.

The information hierarchy hypothesis is not strongly supported for insider purchases as the coefficients are consistently negative though only significant in two of the six regressions. The negative coefficient shows that executive directors earn lower returns than non-executive directors, where the information hierarchy hypothesis suggested the opposite effect.

Given the prevalence of firms in the resource industry in the Australian market and the information asymmetry within this industry, insider purchases earn higher returns in resource firms than in other firms. Four of the six coefficients are positive and significant. This result is in contrast to Brown et al (2003) who reported the resource effect for sales only. Trade size does

⁵ Similar results were obtained with market adjusted returns.

not have an effect on returns, regardless of how it is measured. Three measures of size were used and the coefficients were all insignificant.

For sales in Panel B, the *XLIST* coefficient is positive and significant in three of the six regressions. This result is similar to Korczak and Lasfer (2008) who also reported the bonding hypothesis for sales. In a similar vein to purchases, at least half of the cross-listed insiders do not sell their firm's shares to avoid a future loss which indicates that the sale has not made based on information about the firm's future prospects. It is therefore likely that the additional regulatory scrutiny changed the information environment which reduced their opportunity to earn excessive returns. Therefore, it is likely that sales were conducted for non-informational reasons. The result is also stronger over the 50 day return window than the 125 day window, again showing that there is no strategic reason for trading. Both λ s in the Heckman regressions are also negative and significant, indicating a bias in the OLS estimates.

The *EXEC* dummy variable is negative and significant only in the 2SLS [0: 50] regression while the *RESOURCE* coefficient is positive and significant in the Heckman [0: 125] regression. Therefore, the information hierarchy and resource industry effects are weak and generally not present in the analysis. The trade size effect was not evident with sales with all three size measures. However, only the results for the relative value measure are presented in Table 4.

<Insert Table 4 here>

5. Summary and Conclusions

In this paper, the bonding effect is examined where returns from insider trading proxy for the private benefits of control. We study the trades of insiders because of their position within firms where they have access to information not generally available to other shareholders. We use the arguments of Coffee (1999, 2002) and Stulz (1999) that insiders can be prevented from extracting excessive private benefits via cross-listing because of the higher regulatory scrutiny of the destination market. The implicit assumption is that firms cross-list to a higher regulatory environment to obtain benefits such as less market segmentation, improved liquidity, better information environment and enhanced investor protection. We compare the bonding effect between cross-listed and domestic firms and predict that it will reduce trading returns for insiders when they buy and sell shares.

We define cross-listing in this paper for the purpose of testing the bonding hypothesis as firms cross-listed on either the NYSE or NASDAQ. In our sample, these firms are about ten times larger than the domestic firms with less debt and more analyst coverage and better growth opportunities. However in terms of performance, cross-listed firms do not perform significantly better than domestic firms.

The market reaction to announcements of insider purchases (sales) in cross-listed firms is negative (positive). Over the longer term, cross-listed insiders sustain losses with their purchases and sales. This result is puzzling because it is irrational that insiders with their private information would buy shares to make a loss when the timing of the trade can be controlled.

However for sales, it is likely that there are other reasons for the sale besides the firm's future prospects such as liquidity or portfolio rebalancing. Domestic insiders' behaviour was consistent with other insiders and they earned positive returns with their purchases and avoided losses when they sold their shares. The bonding hypothesis is supported for both purchases and sales because the returns cross-listed insiders earned are lower than those earned by domestic insiders. Cross-listing changed the information environment and the trading behaviour of its insiders such that they are less likely to trade on private information. When these insiders traded in their own firm's shares, they trade for non-informational reasons and our measure of returns cannot capture the reason for the trade. The interests of shareholders, especially uninformed investors are therefore protected because insiders do not exploit their informational advantage to trade on price sensitive information. Overall, if the objective of cross-listing is to improve investor protection, this can be achieved from the perspective of insider trading returns.

While our paper finds support for the bonding hypothesis from the managerial incentives perspective, it has not taken into account other differences between cross-listed and domestic firms. Cross-listed firms may have different governance mechanisms which in turn affect firm insider trading policies. Remuneration packages are also likely to differ with insiders receiving varying proportions of their remuneration in the form of options and shares such that share trading becomes more important to personal wealth. This in turn changes the proportion of informed trading undertaken by insiders. Future work in this area should include other aspects of managerial incentives such as executive remuneration and ownership information.

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Table 1

Firm characteristics: cross listed and domestic firms

	Cross-listed firms (n = 12)		Domestic only firms (n = 239)			
	Mean	Median	Mean	Median	<i>t</i>	<i>Z</i>
Market Capitalisation (\$ mil)	13932.68	1995.58	1206.84	443.58	12.484***	-7.296***
Total Assets (\$ mil)	18070.14	688.60	1950.75	350.50	9.615***	-2.538**
Return on Assets (%)	5.70	10.30	4.48	6.00	0.861	-3.237***
Gearing (%)	35.17	39.54	54.78	39.05	-2.256**	-1.227
Analyst Following	7.11	7.00	6.14	6.00	2.503**	-1.681*
Market to Book	4.58	4.65	3.28	2.29	3.395***	-9.639***

Market capitalisation and total assets are measured in AUD. The *t*-test measures the difference in means while the Wilcoxon test measures the difference in medians.

*** indicates significance at 1%, ** at 5% and * at 10%.

Table 2

Characteristics of trades by insiders in sample firms

	Cross-listed firms (n = 12)		Domestic firms (n = 239)			
Purchases (n = 968)	Mean	Median	Mean	Median	<i>t</i>	<i>Z</i>
Number of shares (thousands)	39.48	10.00	61.09	17.00	-1.340	-1.709*
Parcel value (\$ thousands)	71.05	24.61	153.73	21.83	-0.938	1.154
Relative value (%)	0.078	0.009	0.069	0.005	0.190	0.623
Sales (n = 321)						
Number of shares (thousands)	41.82	4.00	139.80	69.50	-4.620***	-8.332***
Parcel value (\$ thousands)	828.26	25.48	758.27	122.95	0.214	-4.005***
Relative value (%)	0.007	0.001	0.243	0.045	-2.465**	-10.419***

The parcel value is measured in AUD. The t-test measures the difference in means while the Wilcoxon test measures the difference in medians.

*** indicates significance at 1%, ** at 5% and * at 10%.

Table 3

Post trade size adjusted returns: cross-listed and domestic firms

	Cross-listed firms		Domestic firms			
Returns	Mean	Median	Mean	Median	<i>t</i>	<i>Z</i>
<i>Panel A: Purchases (n = 968)</i>						
[0: 5]	-0.022**	-0.023	0.011***	0.003	-2.943***	-3.580***
[0: 10]	-0.018	-0.030	0.026**	0.004	-0.879	-2.600***
[0: 50]	-0.011	-0.023	0.016	0.013	-0.646	-1.422
[0: 125]	-0.091***	-0.130	0.054***	0.027	-2.449**	-3.441***
<i>Panel B: Sales (n = 321)</i>						
[0: 5]	0.004	0.005	0.003	-0.001	0.139	-0.361
[0: 10]	-0.001	0.012	-0.001	-0.012	0.015	-1.251
[0: 50]	0.032	0.013	-0.034***	-0.050	3.041***	-3.719***
[0: 125]	0.031	0.002	-0.023	-0.055	1.309	-2.529**

Statistical significance from zero is estimated for the means and the *t*-test measures the difference in means while the Wilcoxon test measures the difference in medians.

* indicates statistical significance at 10%, ** at 5% and *** at 1%.

Table 4
Effect of cross-listing on insider trading returns

<i>Panel A: Purchases</i>								
	[0: 50]				[0: 125]			
	Probit	OLS	2SLS	Heckman	Probit	OLS	2SLS	Heckman
<i>Constant</i>	-7.74*** (-5.79)	0.29 (0.86)	-0.27** (-2.42)	0.12 (1.61)	-7.74*** (-5.79)	0.37 (0.89)	0.01 (0.09)	0.03 (0.36)
<i>XLIST</i>		-0.09 (-1.11)	-1.09 (-1.53)	-0.31 (-1.34)		-0.24** (-2.14)	-1.11 (-1.42)	-0.80*** (-2.92)
λ				0.10 (0.94)				0.27** (2.11)
<i>REL_VALUE</i>		0.00 (0.13)	-0.00 (-0.31)	0.00 (0.66)		-0.01 (-0.57)	-0.01 (-0.81)	-0.01 (-0.89)
<i>EXEC</i>		-0.04* (-1.77)	-0.08* (-1.91)	-0.04 (-1.59)		-0.01 (-0.10)	-0.03 (-0.81)	-0.01 (-0.15)
<i>RESOURCE</i>		0.08 (0.59)	0.37* (1.72)	0.09** (2.04)		0.19 (1.25)	0.44* (1.90)	0.23*** (4.19)
<i>MVE</i>	0.29*** (4.56)	-0.01 (-0.52)			0.29*** (4.56)	-0.01 (-0.54)		
<i>M/B</i>	0.03 (1.24)	-0.00 (-1.54)			0.03 (1.24)	-0.00 (-0.58)		
<i>Year dummies</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>
<i>Pseudo R²</i>	0.12				0.12			
<i>R²</i>		0.04				0.11		
<i>Wald Chi²</i>			14.18	19.88			49.01	68.47
<i>n</i>			588				588	

Panel B: Sales

	[0: 50]				[0: 125]			
	Probit	OLS	2SLS	Heckman	Probit	OLS	2SLS	Heckman
<i>Constant</i>	-16.79*** (-8.33)	-0.38*** (-2.58)	0.13** (2.03)	-0.03 (-0.92)	-16.76*** (-8.33)	-0.67 (-1.79)*	0.03 (0.37)	-0.14** (-2.46)
<i>XLIST</i>		-0.01 (-0.20)	0.33*** (3.87)	0.14*** (3.07)		-0.05 (-0.95)	0.29** (2.47)	0.09 (1.28)
λ				-0.08*** (-2.89)				-0.08* (-1.78)
<i>REL_VALUE</i>		0.00 (1.00)	0.02** (2.50)	0.00 (0.03)		-0.01 (-0.74)	0.01 (0.44)	-0.01** (-2.16)
<i>EXEC</i>		-0.02 (-1.10)	-0.04** (-1.99)	-0.01 (-1.05)		-0.01 (-0.26)	-0.03 (-0.86)	0.00 (0.03)
<i>RESOURCE</i>		0.04 (1.34)	0.01 (0.31)	0.04 (1.58)		0.08 (0.99)	0.05 (1.15)	0.09** (2.15)
<i>MVE</i>	0.75*** (7.89)	0.02*** (2.68)			0.74*** (7.90)	0.03* (1.76)		
<i>M/B</i>	0.07*** (3.16)	0.01** (2.03)			0.07*** (3.11)	0.00 (0.17)		
<i>Year dummies</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>
<i>Pseudo R²</i>	0.37				0.36			
<i>R²</i>		0.14				0.11		
<i>Wald Chi²</i>			41.17	44.69			37.18	38.82
<i>n</i>			382				379	

The OLS, 2SLS and Heckman-type regressions are presented in this table. In the first stage probit regression for the 2SLS and Heckman procedures, the dependent variable takes a value of 1 when a firm is cross-listed and 0 otherwise. The second stage 2SLS regression uses *XLIST* as an instrument (fitted value). λ is the inverse Mill's ratio, a selectivity term estimated in the first stage Heckman procedure. The dependent variables are cumulative size adjusted returns measured over 50 and 125 days where day 0 is the date when the trade is reported. The independent variables are as follows: *REL_VALUE* is the natural logarithm of number of shares traded multiplied by trade price divided by the firm's market value of equity; *EXEC* is an indicator variable that takes on a value of 1 when the insider is an executive director and 0 otherwise; *RESOURCE* is an indicator variable that takes on a value of 1 when the firm is in the resource industry and 0 otherwise; *MVE* is the natural logarithm of the market value of equity at balance date and *M/B* is the ratio of the firm's market value of equity to its book value of equity. Regression coefficients are given with the t-values in parentheses. * indicates statistical significance at 10%, ** at 5% and *** at 1%.