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An Investigation of Insider Trading Around Australian Share Buy-backs

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Abstract

The Australian mechanism and environment for conducting buy-backs is unique and very different to that of the US and the UK. We examine the capital market response and the trading patterns of directors around a sample of 323 Australian buy-back announcements over the period January 1996 to December 2000. The Australian capital market reacts positively in the short run to all types of buy-back announcements hence insiders have an incentive to use information of impending buy-backs to trade to their advantage. Our results confirm this as the total amount of abnormal insider trading activity (purchases and sales) increases prior to the buy-back announcement. More significantly, conclusive evidence is presented that directors' purchases/sales over the buy-back period are associated with neutral/positive *pre-transaction* abnormal returns and are associated with positive/negative *post-transaction* abnormal returns. Not only are directors able to identify the potential favourable outcome of the impending buy-back but, on average, time their trade at precisely the optimal point to maximize their gains. Executive/non-executive directors trade several weeks prior to/in the immediate period before, the buy-back announcement respectively reflecting their relative position within the information hierarchy. Signalling properties of directors' purchases over and above the information presented in the announced motivation of the buy-back are established.

Key Words: Information-signalling, share buy-backs, and insider trading.

***JEL Classification*:** G14, G32, G34, G35.

EFM Classification: 140, 150.

1. Introduction and Motivation

The rapid growth of share repurchases during the early to mid 1990s in the United States (US) is one of the most significant corporate finance trends over that period. For instance from 1985 to 1996, the number of open market repurchases undertaken by US industrial firms grew exponentially from 115 to 755 (Fenn and Liang, 2001). A similar trend has emerged in other countries. Following the liberalization of Australian buy-back regulations in 1995 the number of buy-backs undertaken by Australian companies increased rapidly. In the year 2000 alone Australian companies bought back a substantial A$11.4 billion worth of shares.[1]

The economic impact of share buy-backs and their financial implications has generated considerable academic interest in this area. A number of US studies have provided evidence of a share price reaction and that repurchase announcements convey firm-specific information to capital markets. Studies in other countries have for the most part confirmed the robustness of the US results notwithstanding the different tax, environmental, legislative and institutional framework that exists in these other jurisdictions. It is clear that on average capital markets view tender offer and open market buy-backs, or their equivalents, as positive signals.

Motivated by the recent high profile debate on insider trading issues in Australia,[2] we investigate whether managerial interest plays a role in the manager's decision to initiate share buy-backs. The managerial interest theory stems from the principal-agent problem that exists between corporate managers and shareholders (Jensen and Meckling, 1976). The inability to match managerial objectives with that of shareholders leads managers to undertake decisions that do not necessarily maximize shareholder wealth. Hence, the potential link between share buy-backs and insider trading is that managers may initiate buy-backs so as to trade on this private information and earn abnormal returns. Even if they do not initiate the buy-back with that mindset then they can use their enhanced information set to capture some of the gains of the forthcoming positive announcement and share in the 'economic rents'. Recent literature by Fried (2001) highlights the possibility of directors undertaking buy-backs for their personal interest.

This paper aims to investigate the trading patterns of directors around Australian buy-back announcements. As a starting point the short run market reaction to the announcements is examined. Similar to previous studies our results confirm, a significant positive initial reaction to the announcement of on-market buy-backs (the equivalent of open-market) and equal access buy-backs (similar to fixed price tender offers). Contrary to the US results we find that selective buy-backs (same as targeted repurchases) have positive abnormal returns. Furthermore, managers take advantage of the impending good news by increasing insider trading activity (both purchases and sales) prior to the buy-back above normal levels. More importantly, overwhelming evidence is presented that firms with directors' purchases/sales

[1] Hyland, S., Share Buyback Boom, The Good, The Bad and The Ugly, *The Australian Financial Review*, 7-8 April 2001. This represents 1.7% of the A$670.9 billion market capitalisation of the stock exchange as at 31 December 2000.

[2] CASAC Insider Trading Discussion Paper, June 2001.

over the buy-back period are associated with neutral/positive *pre-transaction* abnormal returns and are associated with positive/negative *post-transaction* abnormal returns. Reflecting their position within the information hierarchy, both executive and non-executive directors trade at different points in time prior to the buy-back. Executive directors trade several weeks prior whereas non-executive directors trade in the immediate period prior to the buy-back announcement. In sum, directors are aware of the upcoming buy-back announcement and/or have superior insight into the value of the company, which provides both the impetus for the buy-back and consequently trade on that information making substantial abnormal return gains. The signalling power of the directors' trades in the period before the buy-back announcement is conclusively illustrated.

Buy-backs in Australia are a vastly different proposition from that in the US and the United Kingdom (UK). For a start there are different regulatory and tax considerations. In Australia there are well-defined buy-back categories and formal stringent *Corporations Law* (now *Corporations Act*) and Australian Stock Exchange (ASX) disclosure requirements. This is unlike the loose definitions and regulations in the US and the UK (Dharmawan and Mitchell, 1999). Another factor for Australia, similar to the UK, is that of dividend imputation (Rau and Vermaelen, 2002). Dividend imputation systems favour dividend distributions relative to repurchases as the tax credits attached to dividends reduce the tax burden or make them tax free for many investors. Australian buy-backs are subject to capital gains tax which further compounds the tax disadvantage. Accordingly, the economic benefit of buy-backs as simply a distribution policy is less attractive in the Australian market.

In contrast, Australian buy-backs are more likely to be effective as a signalling mechanism for a number of salient reasons. One major difference is that repurchased shares must be cancelled and cannot be held as treasury stock. Hence, the flexibility that treasury stock provides, especially in relation to executive and employee stock option plans, is thus not available in Australia. For instance, it is not possible to build up an inventory of company stock buying at low prices in order to reissue shares at a later date to executives. As such, more rigidity is associated with the buy-back decision in terms of capital structure. Another issue is that to a certain degree the repurchase declaration in the US (Stephens and Weisbach, 1998), and certainly the UK (Rees, 1996), is not a firm commitment. The announcement for these countries is simply a general mandate, which the company may elect to exercise at a later date. Effectively, it represents an intention to *potentially* purchase. This can be contrasted with the nature and implementation of the buy-backs in Australia. First, authorisation is not required and/or seen as important for most on-market buy-backs (up to 10% of capital). Second, the buy-back is communicated to the market in the form of an *announcement* and intention not a general mandate. The language is more definite. Third, there is a general expectation by both the company and in the market that the shares are going to be bought back. Overall, in Australia the buy-back announcement is more communicative and informative as to an *actual* buy-back, so the reaction is likely to be stronger.

The final and most important distinction is that Australian buy-back announcements are unique. A pro forma announcement notice (*Appendix 3C*) is required by the ASX which

provides disclosure and transparency of the buy-back process. Crucially, in addition to the number of shares planned, details of the timing and to what extent the directors are going to participate in the repurchase the announcement notice *must* provide a reason for the buy-back. As the identification of the motivation is otherwise difficult to establish, buy-backs in Australia provide a valuable element of signalling not available and which can not be adequately tested in other markets. In all, the different and unique environment of Australian buy-backs is of particular interest as the signalling properties are greater and so directors may be more inclined to take advantage of their inside information.

The incremental contribution and impact of our study can be summarized in a number of ways. First, we examine insider trading and buy-backs in conjunction, considering together these two important signalling mechanisms. No other study has done this in Australia and there is only one previous study in the US (Radd and Wu, 1995) that specifically looks at open-market repurchases. As noted above it is also doubtful whether the US and UK results can be assumed to apply in the Australian context, which has a radically different buy-back environment. Previous studies in the US such as Lee, Mikkelson and Partch (1992) and Pettit, Ma and He (1996) for tender offers; and Radd and Wu (1995) for open-market repurchase focus on insider trading over a long time period, namely months or quarters, leading up to the repurchase announcements. Here we concentrate on *daily* insider trading activity rather than monthly. This facilitates a closer scrutiny of the impact of the insider trading in relation to the specific announcement of interest and allows us to directly examine how abnormal trading behaviour changes in a more precise way immediately prior to the announcement date. We moreover differentiate the behaviour of insider trading based on whether the motive for the buy-back is expressly stated as to signal undervaluation or not and/or whether trading is conducted by executive or non-executive directors. Our final comparative advantage is rather than use absolute volume levels of insider trading we use abnormal measures defined relative to the company itself and which are further standardized by the number of ordinary shares (Penman, 1985). In so doing we overcome the problems of selecting appropriate company benchmarks (Pettit et al., 1996) and the instability of using absolute volume estimates (Penman, 1985; Park, Jang and Loeb, 1995).

In the next section we consider briefly some of the previous literature focusing specifically on the information asymmetry aspects as well as insider trading around buy-back events. Hypotheses are formulated in section 3 and section 4 outlines the data and method adopted. Results are presented in section 5 and the final section provides the summary and conclusion based on our findings.

2. Literature Review

2.1 Information Asymmetry

The information asymmetry that exists between managers and shareholders is hardly surprising. It is well established that directors and managers involved in the daily running of a company have in their possession confidential information. This enables informed directors to predict the value of the firm and its future performance with greater accuracy. Share buy-backs are a natural product of and a means of reducing the information asymmetry between management and shareholders.

The capital market response to share buy-back announcements has been well documented over the past 20 years or so by US studies such as Dann (1981), Vermaelen (1981), Comment and Jarrell (1991) and Ikenberry, Lakonishok and Vermaelen (1995). These studies establish that announcements of open market, Dutch-auction and fixed price tender offer repurchases elicit a positive market response.[3] The positive market response attests to the fact that managers convey valuable information to the share market by initiating such repurchases. Many of these studies find general support for the signalling of undervaluation and free cash flow theories and agree that buy-back announcements lead capital markets to infer that a firm's share price is too low and prompt market participants to revise their expectations of the company. In general, prior studies have shown that repurchases that follow the fixed price tender model provide the strongest signal, followed by Dutch auction repurchases and then open market repurchases. Finally, the positive market gains are persistent and do not decrease post buy-back announcement (Ikenberry et al., 1995). On the other hand targeted buy-backs are usually associated with negative price reactions. Bradley and Wakeman (1983) and Mikkelson and Ruback (1991) note this is consistent with the management entrenchment theory.[4]

Results from other countries have by in large been similar to the results for the US. Ikenberry, Lakonishok and Vermaelen (2000) demonstrate similar positive short and long run abnormal returns in Canada as in the US. In the United Kingdom (UK), Rees (1996) analysing the impact of *actual* open market repurchases finds a small 0.25% positive abnormal reaction. This result is notwithstanding the substantial differences in the conditions of the repurchase environment between the US and the UK. However, this result cannot be compared to the *announcement return* examined in the US studies as it considers the response at the point in time when the company actually repurchases the shares.

A more recent UK study by Rau and Vermaelen (2002) looks specifically at the announcement effect of the repurchase and concluded that repurchasing firms have smaller excess returns than those documented in the US both in the short (1.14% for the announcement period) and long run (-2% for one year). One aspect that prevents managers from timing their share repurchases in the UK is the more stringent insider trading regulations especially concerning future earnings as well as the overall less favourable tax consequences of repurchases stemming from the imputation system of dividends. Yet another issue here is the buy-back authorisation or announcement date in the UK is often largely procedural and may have little information content (Rees, 1996). While this aspect is perhaps not as severe an issue as noted by Rees, the impact of announcing a *potential to repurchase* will be diluted to the extent that for many companies the market is aware this is simply a formality and will not necessarily result in the firm making an actual repurchase. Finally, the phenomenon of share repurchases has continued to spread to other countries in Asia such as Japan where the announcement period abnormal return is around 5% (Zhang, 2002) and to European counties where the activity is in its infancy at present but is likely to

[3] The Dutch-auction tender offer is where the firm offers to buy back a specified amount of shares within a given price range at which shareholders can tender.

[4] Managers conduct targeted buy-backs from individual shareholders to entrench their positions and this entrenchment may not be in the interest of shareholders.

become more prominent over time. For the European countries Lasfer (2000) finds that returns on announcements of the intention to (potentially) repurchase shares are only slightly positive and are insignificant. Apart from the European countries, which have limited experience and activity with repurchases, the evidence is consistent with the positive response of the US findings.

Australian studies such as Harris and Ramsay (1995), Christianto, Clarke and Mitchell (1997) Lamba and Ramsay (2000) and Da Silva Rosa, Lee, Peris and Walter (2000) have documented a positive capital market reaction to the buy-back announcement.[5] These Australian studies partially but not completely confirm the significant results of the US studies in relation to on-market or open market repurchases. Harris and Ramsay (1995) reported positive, but insignificant, abnormal returns for the 11-day window surrounding the buy-back announcements. Another study by Christianto et al. (1997) found significant positive results solely for on-market buy-backs although only for the actual event announcement day itself. Generally, equal access buy-backs – the equivalent of tender offers in the US – convey a positive reaction as well but not as significant as the on-market buy-backs. In some studies the equal access returns are not significant at all. Different to the US findings, equal access buy-backs do not provide a stronger signal than open-market repurchases. It is difficult to assess the signalling power of equal access relative to on-market buy-backs as the equal access buy-backs are pro rata at a fixed price, which is similar to and has to be evaluated in light of the firm's dividend policy. In stark contrast to the *negative* abnormal returns for target repurchases in the US the Australian studies found a *positive* albeit insignificant result for the equivalent selective buy-backs. More recent studies of Lamba and Ramsay (2000) and Da Silva Rosa et al. (2000) obtain results broadly similar to the early studies already noted.

Several motivations for buy-backs have been documented in the literature (Fried, 2001). We recognize that these motivations are interrelated and hence there is difficulty in trying to investigate any particular one in isolation. However, on the whole, the traditional signaling of undervaluation and free cash flow theories have emerged as the predominant reasons for initiating a share buy-back. This is evident from the responses of management themselves. Mitchell and Robinson (1999) and Mitchell et al. (2001) find that the main motivation for Australian buy-backs is to signal to shareholders the future expectations of the company's performance and the under-valuation of the firm. A recent survey of US managers of firms engaging in open-market repurchases by Baker, Powell and Velt (2003) find that while the importance that management attaches to some reasons for repurchasing has changed the signalling of undervaluation remains the most prominent. By the same token, directors' trading patterns before share buy-back announcements can be viewed as a manifestation of any information asymmetry should this exist. Therefore, a combination of insider trades prior to share buy-back announcements would send a credible signal to the market about the quality of the firm so as to reduce this information asymmetry. For instance Lee et al. (1992) and Pettit et al. (1996) find a net purchase of shares occurs prior to tender offer repurchase announcements. Raad and Wu (1998) report that insider trading

[5] For a comparison of the buy-back types and procedures in the US and Australia as well as more details on the institutional factors of Australian buy-backs see Dharmawan and Mitchell (1999) and Mitchell et al. (2001).

activity prior to the buy-back announcement has a significant relationship with the post announcement abnormal returns and insiders are able to use their superior information as to the worth of the buy-back to elect whether they trade with a great deal of success.

2.2 Insider Trading

Company directors, as a group of corporate insiders, frequently beat the share market when they trade. Their analytical skill and access to price sensitive information are identified as sources of the superior investment performance. Consequently, according to John and Lang (1991, p. 1362), insider trading is "one of the most direct signals" of private information received by the market. Research in the UK (King and Röell, 1988; Pope, Morris and Peel, 1990; Gregory, Matatko, Tonks and Purkis, 1994; Gregory, Matatko and Tonks, 1997; Hamill, McIlkenny and Watson, 1999; Friederich, Gregory, Matatko, and Tonks, 2002) and the US (Jaffe, 1974; Finnerty, 1976; Givoly and Palman, 1985; Seyhun, 1986; Lin and Howe, 1990; Lakonishok and Lee, 2001) has consistently shown that insiders can earn abnormal profits when trading on their own account. One study that achieved a result contrary to that in the UK and US is the Norwegian study by Eckbo and Smith (1998). They investigated insider trades in the closely held Oslo Stock Exchange and found that insiders were unable to generate abnormal returns.

The literature suggests several factors that are correlated with the extent to which profits are made. First is the type of trade. Baesel and Stein (1979) and Nunn et al. (1983), among others, find that purchases were more profitable than sales. Second is the trade size utilised by insiders. Seyhun (1986) confirms that post trade profits per dollar invested increased with trade size, although Lin and Howe (1990) find otherwise. Third is firm size. Information asymmetry i.e., the knowledge gap between insiders and outsiders—is greater for smaller firms, due to their lower level of voluntary disclosure and lack of institutional-cum-analyst following. However, the evidence is again mixed. While Seyhun (1986) and Lakonishok and Lee (2001) find post trade profits are higher for smaller firms, Lin and Howe (1990) find little evidence of the same relationship.

The literature in Australia on insider trading is thin compared to the US and UK mainly due to the unavailability of reliable data prior to 1995.[6] Tomasic (1991) conducted the first direct study of illegal insider trading in Australia. He found that insider trading was more likely to be undertaken by company personnel. Tomasic (1991) reports that insider trading generally took place in the market for shares rather than options and was frequently related to takeover activity.[7] Brown and Foo (1997) investigate the significance of profits from insider trading by directors of listed companies in Australia. Using 482 increases and 412 decreases in directors' holdings reported to ASX in 1996 and 1997, they examine the relationship between directors' dealings and subsequent share price performance relative to the market index. Brown and Foo (1997) discover evidence inconsistent with the literature in the US (Lakonishok and Lee, 2001). In particular, Australian directors' sales are more profitable than their purchases. Moreover, they find little evidence directors had profited

[6] The CASAC *Discussion Paper on Insider Trading* (June 2001) provides a comprehensive overview of insider trading regulation in Australia.

[7] The Australian options market was not particularly liquid in 1991 so this result is not surprising.

significantly from the greater information asymmetry usually ascribed to smaller firms. While sales in resource stocks are found to be substantially more profitable than sales in non-resource stocks, there was no systematic relationship between profitability and the size of the directors' trade.

3. Hypotheses Development

3.1 Capital Market Response

The positive capital market response to share buy-back announcements has been well documented by *inter alia* – Dann (1981), Vermaelen (1981), Comment and Jarrell (1991), and Ikenberry et al. (1995). These studies report that fixed price tender offers followed by Dutch-auction tender offers and finally open-market repurchases have respectively the strongest to weakest positive market response. In contrast, targeted repurchases generate significant negative abnormal returns (Mikkelson and Ruback 1991). As highlighted by Mitchell and Robinson (1999), differences in tax, legislative environment and capital market perception dictate that US results can not be assumed to be applicable to the Australian context. That said, given the Australian capital market evidence noted above it is expected that on average share buy-backs convey positive information to capital markets resulting in a re-evaluation of the company's prospects. This leads to the following hypothesis stated in alternate form:

H1a: There is an increase in the firm's share price on and after the buy-back announcement.

3.2 Directors' Trading Activity

In the US, Park, et al. (1995) find that insiders' trading activities will increase abnormally several weeks before the earnings announcement but trading activity would decrease abnormally in the period *immediately* before the earnings announcement. The period immediately before the announcement has a higher degree of public and regulatory scrutiny and the threat of any trade being identified as an inside one is greater. It follows that the potential cost and perceived risk of insider trades in the period immediately prior to the announcement is correspondingly higher. In Australia, Watson and Suherman (1998) find that directors' trading activity immediately prior to earnings announcements was abnormally high, suggesting a certain disregard for insider trading regulations or that directors in Australia only receive the earnings information closer to the release date. However, we suspect that similar behavior to that noted in Park et al. occurs around share buy-back announcements. This leads to the conjecture that:

H2a: Directors' trading activity *increases* several weeks before the share buy-back announcement.

H3a: Directors' trading activity *decreases* in the period immediately before the share buy-back announcement.

3.3 Directors' Purchases and Sales

In general, as buy-back announcements are viewed as 'favourable' events with positive abnormal returns we expect that insiders will engage in an active trading strategy to purchase stock prior to the announcement. The ability of insiders to identify favourable/unfavourable events and trade on that information is established in Givoly and Palmon (1985) and Seyhun (1986). More directly Lee et al. (1992) in relation to tender offers and Raad and Wu (1995) for open market repurchases document that the number of directors' *purchases* increases in the month prior to the repurchase announcement. Given the 'favourable' information content of the impending buy-back it seems logical to expect:[8]

H4a: There is an *increase* in directors' *purchasing* activity in the period prior to the buy-back announcement.

H5a: There is a *decrease* in directors' *selling* activity in the period prior to the buy-back announcement.

3.4 Directors' Purchases/Sales and Abnormal Returns

One implication of the Raad and Wu (1995) evidence is that insiders' may time transactions to take advantage of gains around the buy-back period. While not explicitly tested in any previous research on buy-backs we do so here. This sharpens the analysis to focus directly on not just whether gains are captured from the buy-back event itself but the extent of the *overall* gain from the insider trade over the buy-back period. It enables us to identify just how valuable insider information actually is in terms of total abnormal return. Insiders do time their trades relative to the voluntary release of corporate earnings forecasts (Penman, 1980) so there is reason to expect they would do so for buy-back announcements. We therefore investigate the (±125 day) share price behaviour around *directors' insider trade transactions* associated over the buy-back period.

H6a: Directors' *purchases/sales* transactions around the buy-back period are associated with negative/positive *pre-transaction* abnormal returns.

H7a: Directors' *purchases/sales* transactions around the buy-back period are associated with positive/negative *post-transaction* abnormal returns.

3.5 Information Hierarchy

Based on the information hierarchy argument proposed by Nunn, Madden and Gombola (1983), executive directors possess greater information on the firm and are more aware of insider trading penalties. One implication of this information hierarchy is that that

[8] Directors who wish to reserve the *right* to sell their shares during the buy-back period were required under ASX Listing Rules 3.8A to state their intention to participate and the number of shares they wanted to sell in the buy-back in the *Appendix 3C* notice. Following amendments to the listing rules on the 30 September 2001 this information is no longer specifically required.

executive directors will not trade in the period immediately before the buy-back announcement. If they want to take advantage of their private knowledge they will trade at an earlier date. It seems logical that non-executive directors are more likely to trade in the immediate period prior to a buy-back, as they will only receive the information later and closer to the announcement date. Watson and Young (1998) and Watson and Chong (2000) find evidence to support this theory. Accordingly, we have:

H8a: *Executive directors* refrain from trading in the immediate period around the buy-back announcement.

H9a: *Non-executive directors* have increased trading in the immediate period around the buy-back announcement.

3.6 Signalling Issues

Comment and Jarrell (1991) suggest that the greater the manager's stake in the company the more credible the buy-back signal as the cost of providing a false signal increases. In the same way, insiders net purchasing/selling activity may on its own accord provide a signal or reinforce/reduce the credibility of the buy-back. The inside activity signal can be either intentional or unintentional. In conjunction, Ikenberry et al. (1995) and Cudd, Duggal and Sarkar (1996) report firms that conduct buy-backs with the intention to signal undervaluation as compared to other motivations experience a greater level of abnormal returns. The capital market does take into account the buy-back motivation and reacts accordingly. Unlike the US where it is rarely provided, in Australia the reason for the on-market buy-back must be *explicitly* stated as part of the announcement. The buy-back motivation is part of the detail required by the ASX in the *Appendix 3C Announcement of Buy-back* form. As a result we now have two methods of signalling that are available to investors and each may provide insight into whether the buy-back is a 'favourable' event.

H10a: Firms that announce a buy-back with the motivation to signal undervaluation have *greater* abnormal returns.

Raad and Wu (1995) find that insiders are able to predict the potential benefit of the repurchase and trade on the information. Open market stock repurchases announced after net insider buying/selling activity in the month prior the announcement experience a greater/lower level of post announcement abnormal returns.

H11a: Firms with *net* insider *purchasing/selling* activity in the period prior to the announcement experience a *greater/lower* level of post-buy-back abnormal return.

Similarly, a comparison of the signalling properties of the motivation vs. the net purchase/sales of insider trading is appropriate.

H12a: Firms with *net* insider *purchasing/selling* activity in the period prior to the buy-back announcement have a *greater/lower* level of post-buy-back abnormal returns compared to those that signal undervaluation.

4. Data and Method

4.1 Share Buy-back Data

The share buy-back dataset covers the sample period from 1 January 1996 to 31 December 2000. This study examines all ASX buy-backs regardless of whether the programs have been completed. The initial database for this study is the data set used in Mitchell, Izan and Lim (2002). The Mitchell, Izan and Lim data set covered the period from November 1989 to June 1998 and contained a total of 186 share buy-backs announcements.[9] Additional buy-back announcements from January 1998 to December 2000 were obtained from Signal G records via the Securities Industry Research Centre of the Asia Pacific (SIRCA).[10] The SIRCA database yielded a preliminary total of 824 buy-back related announcements for the 3-year period.

The full Signal G commentary for each of the 824 buy-back announcements was examined. The examination of the Signal G commentary was made available by SIRCA through its online Signal G announcement search engine. In examining these announcements, the company's relevant buy-back details were extracted. These details included (i) the announcement date, (ii) the submission date of Form 280/281 indicating the intention to buy-back,[11] (iii) the start and completion date of the buy-back, (iv) the type of buy-back, (v) the motivations for conducting a buy-back,[12] (vi) number of shares announced for buy-back, (vii) the number of shares outstanding and (viii) the industry code.

The data was filtered employing several criteria. (i) Only ordinary share buy-backs were included. (ii) Buy-back announcements that were extensions were included but separately classified.[13] The same applied to buy-backs by investment trusts which were also separately identified. (iii) Odd lot buy-backs and employee scheme buy-backs were not considered. (iv) Furthermore, any buy-backs that do not have the relevant buy-back details were omitted.[14] (v) Naturally, daily buy-back announcements made by firms, which simply state details of shares bought back; and (vi) announcements that were variations to the original buy-back announcement were not included as they relate to the operation of buy-back mechanism only.

After applying these initial filtering criteria, 258 buy-back announcements for the period from 1 January 1998 to 31 December 2000 and 100 buy-back announcements from 1

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9 The overlapping period in the Mitchell et al. (2002) dataset from January 1998 to June 1998 was used to crosscheck with the buy-back dataset of Signal G to ensure that all buy-backs were identified.

10 Signal G is the data feed provided by the ASX to communicate firm announcements and disclosures to brokers and investors.

11 The current ASX buy-back submission form is *Appendix 3C – Announcement of Buy-back*, which is a requirement under ASX Listing Rule 3.8A for all except minimum holding buy-back types. Prior to 1 September 1999 the submission form was contained in *Appendix 7B* with identical requirements.

12 All the reported motivations were recorded. However, in this study we are interested only in distinguishing the signaling of undervaluation relative to other motivations.

13 ASX Listing Rule amendments (September 1999) now allow unlimited duration rather than a six-month limit.

14 Announcements where the type of buy-back and/or the number of shares intended to be bought back were not specified were excluded.

January 1996 to 31 December 1997 were identified.[15] Hence, our potential sample consists of 358 buy-back announcements by 198 firms from 1 January 1996 to 31 December 2000. However, because of unavailable or missing price data 35 buy-back announcement events were discarded leaving us with a workable data set of 323 observations. Firms which were listed within 150 days prior to the buy-back announcement, delisted 50 days after the announcement and/or had 80% of more daily price data missing from the event period were considered unusable due to lack of data.

The identification of the earliest share buy-back announcement date was a difficult issue. This problem arose because companies do not follow a consistent sequence of announcing their intention to buy-back shares. In this study, we examined the three main methods of announcing a buy-back, which were: (i) Submission of Form 280/281 to the ASX announcing the firm's intention to conduct a buy-back,[16] (ii) Submission of the *Appendix 3C* form to the ASX containing the buy-back details; and (iii) notice of meetings and/or results of meeting when shareholder approval is required for buy-back. Therefore, the earliest of the three announcement dates was defined as the event date.

We use an event study method to measure the market's reaction to the buy-back announcements and the daily share prices for the event window [±125 days] were obtained from Core Research Data via the SIRCA database. The market capitalisation for each of the buy-back announcements was obtained from the Share Price and Price Relative (SPPR) database that is complied by the Centre for Research in Finance at the Australian Graduate School of Management. The SPPR database provides the market capitalisation and the outstanding shares of companies on a monthly basis. We extracted the market capitalisation and outstanding shares of the buy-back companies in the month prior to the announcements. Size-deciles were determined in the month prior to the buy-back announcement based on the company's market capitalisation relative to all ASX stocks covered by the SPPR database.

4.2 Directors' Trade Data

The data on directors' trading activity are based on trades that are reported as required under section 205G of the *Corporations Law*.[17] Directors' trade information was compiled from two sources. The first was the *Australian Financial Review Shareholder* ('The Shareholder') publication which is bi-annual publication capturing information on changes in directors' holdings including the date of the change. The second was the Signal G database which identifies notifications of the changes in directors' interest.[18] The Shareholder was used as the primary data source and the data then validated using the Signal G database. As The Shareholder is confined to the top 500 ASX listed companies based on market capitalisation our insider trading analysis is restricted to these companies.

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15 These 100 announcements were obtained out of the 126 announcements identified by Mitchell et al. (2002) for the January 1996 to December 1997 time period.

16 *Corporations Law* section 257G (old 206G) requirement of 14 days notice to be given to the ASIC (and implicitly the ASX through the listing rules) before the buy-back agreement is entered into.

17 Previously in section 235 of the *Corporations Law*.

18 Changes in directors' interests are noted under code 002 007 'Section 205G Notice – Directors' Interest'.

The final period for the insider-trading sample was shortened to begin from 1 July 1996 instead of 1 January 1996 due to our requirement of having director trading data for 6 months for the estimation period [-150, -51] prior to the event period [±50 days].

We extracted the relevant directors' trades that occurred for the period [-150, +50] around the share buy-back event. We identified a total of 314 directors' trades associated with 120 buy-back announcements conducted by 77 companies from 1 July 1996 to 31 December 2000. The 314 directors' trades consisted of 227 purchases and 87 sales. The sample is further subdivided into executive directors and non-executive directors and those announcements where the motivation of the buy-back was stipulated as to signal undervaluation as opposed to an alternative motivation. Historical information on directors' titles for the respective company is collected from '*The Business Who's Who of Australia*' (BWW) via CD-ROMs and current information is accessed online. Our study defined executive directors, as those who were involved directly in the day-to-day operations of the company and non-executive directors were those not involved in its daily affairs.[19]

4.3 Method

Abnormal Return Calculation

We adopt a standard event study method where the events examined are the date the buy-back was announced and the date of the insider transaction. The abnormal return is defined as the size-decile adjusted return employed by Lin and Howe (1990).

$$\mathbf{AR}_{i,t} = \mathbf{R}_{i,t} - \mathbf{R}_{\mathbf{D}i,t}$$

Where;

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

In addition (i) the raw returns, (ii) value weighted market adjusted returns and (iii) market model adjusted abnormal returns were calculated to evaluate the sensitivity of the results to alternative specifications of the abnormal returns. However, the results for the alternatives are substantially the same so only the size-decile abnormal returns are widely reported. For the abnormal return results the standard abnormal return *t*-statistic was used with estimates of the standard error as the variation over the estimation [-125, -21] period. While only the conventional *t*-statistics are reported to supplement the analysis the non-parametric sign test was used to identify whether the number of positive returns in the event period [±20] is significantly different compared to the number of positive estimation period [-125, -21] returns (see Brown and Warner, 1980). No major differences in the significance results using the non-parametric tests were uncovered.

[19] The BWW database contains information describing the company line of business, contact details and the list of the company's directors and senior management. Directors not listed by BWW as part of senior management were classified as non-executive directors. Both the chairman and vice chairman are automatically deemed as executive directors.

Measurement of Insider Trading Activity

Our study used a similar method to that adopted by Park et al. (1995) to analyze insider-trading activity. First, (i) the absolute volume of shares traded and (ii) the frequency of transactions were used to calculate the level of trading activity. Second, two additional measures namely (iii) the relative volume of shares traded and (iv) the natural logarithm of the absolute volume of shares traded were used to calculate the trading activity of insiders.

Park et al. (1995) and Brown and Foo (1997) acknowledge that the absolute measure of the directors' trading volume is a noisy measure for insider trading activities. Directors could be buying and selling for liquidity reasons or reasons other than insider trading. In addition, Park et al. (1995) report that the absolute measure of insider trading based on number of shares traded is not stable over time due to some extremely large insider trade amounts that resulted in a sizable increase in the daily variance. They believe that these large trades are not likely to be based on insider earnings announcements so hence remove the top 10% insider trades based on absolute volume from their analysis. Insiders are unlikely to be trading large portion of shares given that the abnormal returns are of the order of only 2-4% for the back-back announcement and for the period during and after the announcement are in the vicinity of 10%. Large insider trades are thus more likely to be conducted based on factors relating to forced sale or liquidity issues rather than the impending buy-back.

The frequency of trades executed and relative volume of shares traded measures are used to overcome some of the problems cited by Park et al. (1995). The relative volume of shares traded measure is similar to Penman (1985) and uses the number of outstanding shares in the firm as a deflator. It hence provides a standardized measure of trading. This relative standardized measure of volume is preferred as when compared to the absolute measure it controls for the relative individual company size, trading activity and pool of shares available. Standardizing by the number of outstanding shares thus allows for differences of insider trading across firms for other than information reasons (Penman, 1985).[20]

Given the above literature, we adopt a similar approach to Park et al. (1995) and remove the top 5% of insider trades based on the *relative* volume of directors' trades.[21] We distinguish the top percentage based on relative instead of absolute trade volume for the reasons noted above, namely that the relative measure is a superior measure of insider trading activity.[22]

Absolute and Relative Measures of Directors' Trading Activities

Insider-trading activity is measured using the three measures noted above: the absolute volume of shares traded (ITS), the frequency of trades executed (ITF) as well as the relative volume of shares traded by insiders (RITS).

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[20] The natural logarithmic measurement is used as an additional measure of directors' trading as it provides an alternative method of standardizing and transforming the absolute volume. The results of the natural logarithmic transformation of the trading volume are not provided, as they are qualitatively the same as those using the relative volume of shares traded.

[21] A total of 16 directors' trades were removed.

[22] The results of the directors' trading patterns using the unfiltered dataset are equivalent.

$$\text{ITS}_t = \frac{1}{N_t}\sum_{i=1}^{n} ITS_{it}$$

$$\text{ITF}_t = \frac{1}{N_t}\sum_{i=1}^{n} ITF_{it}$$

$$\text{RITS}_t = \frac{1}{N_t}\sum_{i=1}^{n} RITS_{it}$$

Where

ITS_{it}	-	is the volume of shares traded by insiders in firm *i* on day *t*.
ITF_{it}	-	is the number of transactions made by directors in firm *i* on day *t.*
RITS_{it}	-	is the volume of shares traded by insiders in firm *i* on day *t* divided by the outstanding ordinary shares of firm *i* in that year.
N_t	-	is the number of sample firms trading on day *t.*

These measures of insider trading are computed for the *estimation period* of –150 days to –51 days and *event period* of –50 days to +50 days relative to the firm's share buy-back announcement date. In order to establish if the daily insider trading activity is significantly different from the normal trading levels, it is necessary to calculate a *t*-statistic. In the calculation of abnormal trading levels, Park et al. (1995) used the mean insider trading activity in the estimation period of each individual firm as a benchmark for both volume and frequency measurements. The use of the estimation period using each company, as its own control for the normal level of insider activity is appropriate as the level of normal activity varies considerably from firm to firm. If this is not done then a substantial amount of measurement error could potentially occur (Pettit et al. 1996). The following components are necessary to obtain the relevant *t*-statistic. First, the cumulative abnormal insider trading for the relevant period is defined from day *s* (where $t = s$) to day $s+k$, is calculated as:

$$CITS_{s,\,s+k} = \sum_{t=s}^{s+k} (ITS_s - \overline{ITS})$$

$$CITF_{s,\,s+k} = \sum_{t=s}^{s+k} (ITF_s - \overline{ITF})$$

$$CRITS_{s,\,s+k} = \sum_{t=s}^{s+k} (RITS_s - \overline{RITS})$$

Where:

$\text{CITS}_{s,s+k}$	-	is the cumulative *absolute volume* of shares traded.
$\text{CITF}_{s,s+k}$	-	is the cumulative *number of transactions* made.
$\text{CRITS}_{s,s+k}$	-	is the cumulative *relative volume* of shares traded.
$\overline{ITS}$	-	is the mean absolute insider trading volume during the *estimation* period.
$\overline{ITF}$	-	is the mean insider trading frequency during the *estimation* period.

$\overline{RITS}$ - is the mean relative insider trading volume during the *estimation* period.

Second, the variances of the insider trading activity measures are obtained from *the estimation period* [–150 days to –51 days]. These are calculated as follows:

$$VITS_s = \frac{1}{99}\sum_{t=-150}^{t=-51}(ITS_t - \overline{ITS})^2$$

$$VITF_s = \frac{1}{99}\sum_{t=-150}^{t=-51}(ITF_t - \overline{ITF})^2$$

$$VRITS_s = \frac{1}{99}\sum_{t=-150}^{t=-51}(RITS_t - \overline{RITS})^2$$

Lastly, to establish the significance of the abnormal trading activity the *t*-statistics for abnormal insider trading activity for the period from *s* to *s+k* is calculated as:

$$t - statistic_{its} = \frac{CITS_{s,\,s+k}}{\sqrt{VITS \times k}}$$

$$t - statistic_{itf} = \frac{CITF_{s,\,s+k}}{\sqrt{VITF \times k}}$$

$$t - statistic_{rits} = \frac{CRITS_{s,\,s+k}}{\sqrt{VRITS \times k}}$$

The *t*-statistics are distributed according to the *t*-distribution with $k - 1$ or 99 degrees of freedom provided the insider trading measures are normally and independently distributed over time. The appropriateness of the *t*-test depends on a strict set of assumptions mainly that the underlying distribution of the variable is normal which is unlikely for the various directors trade measures used here. Hence in order to examine the sensitivity of the test results to that assumption of normality equivalent non-parametric tests were computed. For the insider trading activity results a non-parametric sign test using randomised re-sampling from the estimation period is used to test for and check for significance. The non-parametric tests give similar results to the parametric *t*-tests so only the parametric tests are noted.

The insider trading activities measures will be calculated for purchases, sales and total insider activity. The initial sample is then separated into two sub-samples for executive and non-executive directors.

5. Results

5.1 Descriptive Statistics on Share Buy-backs

Descriptive statistics of the distribution of share buy-back announcements by year and type (Table 1 Panel A) gives an overview of both the spread and the increase in buy-back activity in recent periods. Clearly the most popular form of buy-back remains the on-market type accounting for some 84% of buy-back activity over the five-year period of our data. Overall there has been a continuing trend and marked growth in the number of buy-backs over the five-year period. The trend is somewhat cyclical though peaking in 1998 with 82 on-market and 95 buy-backs in total for that particular year. This is a far cry from the pre-1995 total period activity of 67 buy-backs noted in Mitchell and Robinson (1999) for the 1990 to 1995 period. The increase over time reflects the increased acceptance of buy-backs as a distribution and signalling mechanism and moreover the willingness of management to adopt it. It further highlights the restrictive and onerous nature of the regulation in place prior to December 1995.

<< **Insert Table 1 Here** >>

The frequency of buy-backs clusters by industry. Firms in select industries are more prone to undervaluation and so avail themselves of signalling mechanisms such as buy-backs. Investment companies for instance typically claim undervaluation when the net asset backing per share of their total investments measured on a mark-to-market basis exceeds the share price. Looking at the industry breakdown of buy-back activity in Table 1 Panel B confirms this. Over the five-year period from 1996 to 2000 the Investment and Financial Services industry (ASX Industry Code 19) dominates share buy-back activity. Firms in that industry group made up a total of 80 or 22% of the buy-backs.[23] Moreover the Miscellaneous Industrials category (ASX Industry Code 22)[24] had another 53 buy-backs, which comprises a further 15% of the total number. Hence buy-backs are concentrated in select industries with definable characteristics.

A further breakdown of the share buy-back announcements (Table 2) partitions the distribution of announcements according to a number of salient characteristics. The characteristics are - firm size, the percentage of shares to be bought back as per the announcement, the stated buy-back motivations, net insider activity (purchase or sale) that occurs in the period prior to the announcement. From Table 2 Panel A, larger firms conduct a high number and percentage of buy-backs with 37% of firms ranked in the largest size quintile. The concentration of large firms is consistent with the size characteristics of US firms in Ikenberry et al. (1995). In contrast, only 15 (4%) of buy-back firms are from the lowest size quintile. One explanation for the lack of buy-back activity by small firms is they simply do not find buy-backs as useful a mechanism or alternatively they don't have the cash resources to use it credibly. Panel A of Table 2 provides the breakdown of the percentage of shares that the firm announces it intends to buy back. On-market buy-backs typically seek to repurchase in the region of 7.5% to 10% and this is reflected in the results

[23] Out of these 80 firms, 47 were actually designated as equity investors under the code '192'.

[24] Includes firms in the Automotive, Textiles, Household Durables, High Technology, Sugar, Pastoral, Electrical, and Electronic industry sub-groups.

across all buy-backs given in the Table. Procedural requirements stipulated by the legislation drive this finding. The maximum share buy-back percentage that does not trigger the need for shareholder approval for on-market and equal access buy-backs is 10%. Firms declaring the buy-back percentage at or below 10% avoid the necessity of these requirements.

<< **Insert Table 2 Here** >>

Mitchell and Robinson (1999) and Mitchell et al. (2002) both found that the most frequently stated motivation was to signal undervaluation. In Mitchell et al. (2002) 29% of all announcements cited undervaluation as the reason. Our results are consistent with this previous evidence. From Table 2 Panel B, 88 of 358, or 25% of buy-backs, announce the intention to signal undervaluation. Obviously, the motivation to signal undervaluation does not make up an overall majority as other motivations not related to undervaluation are provided in 75% of cases. Based on the statistics in one-quarter of instances firms are conducting the buy-back *explicitly* with a view to signal undervaluation. Given that many firms are explicitly stating that their firm is undervalued insider trading activity prior to buy-back events is likely to occur and be prominent. Overall for the 150 trading days prior to each buy-back announcement, net insiders' purchasing activity for was much greater than that of the net selling activities (see Table 2, Panel B). Of the 120 buy-back announcements that have some directors trading, 73 were a net purchase position, 24 were net sellers and 23 had no directors' trades prior to the buy-back. *Prima facie* this confirms the view that to insiders the buy-back is a favourable event, likely to result in price increases. Lastly, a further breakdown in Table 2 Panel B reveals that the majority of buy-back announcements involve (i) a new buy-back (271), rather than (ii) extension to an existing scheme (40) or (iii) is by an equity investor company (47). The signalling properties of new buy-backs are likely to be greater than that of the other two categories. We turn now to the descriptive statistics on insider trading.

5.2 Descriptive Statistics for Insider Trading Activity

A total of 314 directors' trades consisting of 227 purchases and 87 sales were executed during the sample period (Table 3 Panel A). The number of purchases outnumbers sales by about 3 to 1. Yet again this is consistent with previous findings, namely Brown and Foo (1997) and Watson and Chong (2000). The number of trades executed by non-executive and executive directors is spilt almost 50/50. Consequently, non-executive directors are as likely to trade as executive directors. Taking a closer look in Table 3 Panel A, we see that out of the 314 directors' trades, 70 trades were executed by directors whose firms were conducting buy-backs to signal undervaluation and 61 of these were purchases. For the undervaluation firms the percentage of purchases to total insider trades is high at 87%. In contrast, the percentage of purchases to total trades is only 68% for the (other) firms that did not provide an undervaluation motive.

Even more apparent from Table 3 Panel B is that there are only 3 sales (35 purchases) executed in the period *prior* to the buy-back announcement when the motivation to signal undervaluation is given. There were only 42 sales out of 142 total trades in the period leading up to the buy-back. Hence, managers who wish to signal undervaluation further

reinforce undervaluation by reducing their sales and increasing their purchases prior the announcement. Either insiders trade to take advantage of the favourable buy-back event and/or to strengthen the credibility of the signal. One final comment from Table 3 is that in general directors trade more after compared to before the buy-back announcement. Once again though when the undervaluation motive is given directors have a higher incidence of purchases and lower incidence of sales before the buy-back compared to after the buy-back. In sum insider trading activity reinforces the management motive of undervaluation either by design or through insiders profit seeking behaviour.

<< **Insert Table 3 Here >>**

5.3 The Capital Market Response to Share Buyback Announcement

The size-decile adjusted cumulative price relative for the ±125 days (250 in total) surrounding the buy-back announcement are given in Figure 1 Similarly the average CAR for the narrower event period [±20] is contained in Table 4. Results exhibit a number of interesting features. The results over the immediate announcement period [-2, +2] in Table 4 are as expected and consistent with previous studies. All types of buy-backs have positive CAR with the on-market results being the dominant and only significant result (Panel A). Initial buy-backs have greater CAR and information signalling (Panel B). Firms in the lowest size quintile have the most reaction to the buy-back reflecting a uniform size related effect quite possibly related to information asymmetry (Panel C). The CAR is not uniformly related to the intended percentage of shares to be bought back (Panel D). This occurs due to the different buy-backs and the fact that there is a dichotomous split of the amount intended to be repurchased. On-market buy-backs typically look to repurchase 7.5% to 10% whereas equal access and selective buy-backs repurchase a smaller amount, 0% to 5%. As both groups have, on average, positive CARs this causes the polarisation in Table 4 Panel D. All the buy-back types have positive post announcement CARs and thus potentially have signalling properties, albeit the signalling effect and power is likely to be different across the buy-back types. Nonetheless, as we are primarily interested in evaluating whether prior directors' trading provides a superior signalling effect, we combine all buy-backs types and analyse them conjunctly for the remainder of the research.

<< **Insert Table 4 and Figure 1 Here >>**

We now examine the CARs over the wider period around the buy-back announcement (Figure 1). An obvious and significant positive trend appears for the 125 days before up to the day of the announcement [-125, 0]. An average 5% CAR occurs over the pre-announcement period. Anticipation or leakage of information about the buy-back event is the most logical explanation for this with traders reacting to the anticipation of favourable news. Coupled with this may be a bandwagon effect as insiders purchase shares and then the general market spots that activity. The market would interpret net purchases by insiders with superior information as a favourable signal and hence the demand for the shares increases pushing up prices. The immediate announcement period [-2, +2] abnormal return is 2 to 2.5% (depending on the benchmark used) capturing an initial significant capital market response to the buy-back.

Post announcement the price response is informative. Consistent with our initial expectation (H1a) there is an increase in the CAR of 7.5% after the announcement of the buy-backs (Figure 1). Moreover, the CARs increase steadily up to 42 days after the buy-back. The cumulative returns then plateau and reduce slightly to day 120. This implies that the initial response to buy-back is partly *transitory* as the market then adjusts afterwards and the price falls back. The CAR for the period [0, +125] is 5% with the CAR for the full [-125, +125] period at about 11%. Overall, we are able to confirm our expectation of a positive increase in share price after the buy-back announcement with the caveat that this is mainly evident for the short-term period and dissipates slightly over time. Two aspects are important for short-term trading strategies. First, traders who wish to take advantage of the buy-back announcement in general to earn abnormal returns can do so but for optimality should sell their holdings before day +42. Second, it is more advantageous to anticipate the buy-back event and invest early. Again this highlights the importance of the signal from insider trades. The positive drift in the short run is consistent with US evidence in Vermaelen (1981) and Comment and Jarrell (1991). However our findings are different in one important aspect to the US studies where the pre-announcement returns for tender offers are very close to zero and are negative for the on-market repurchases.

5.4 Insider Trading Activity

In this section, we examine directors' trading patterns around buy-back announcements and consider the possibility that directors have a personal interest in the buy-back announcement. As mentioned in the previous method section, directors' trading activities are measured using the average daily (i) number of directors' transactions (ITF_t); (ii) the absolute volume of shares traded (ITS_t) and (iii) relative volume of shares traded ($RITS_t$). For the moment we evaluate and test relative to the *total abnormal* trading activity. As a reminder total insider activity includes both sales and purchases. Furthermore, abnormal activity is measured with respect to the benchmark normal insider trading behaviour for the estimation period [–150, –51].

Overall trading activity of directors around share buy-back announcements in Table 5 shows a significant number of shares traded for the event period from days –45 to –41, the results are significant at least at the 10% level for both absolute and relative volume trading measures. There is gradual decline in the overall trading volume over the subsequent period from days –40 to –21. We also note that directors' abnormal trading volume is also significant at the 1% for event period from days –15 to –11. Consistent with our absolute volume results, in Table 5 the number of trades executed for the days –45 to –41 is substantially higher compared with the rest of the event period. For the period from days –30 to –2, the number of transactions fluctuates between 2.2 and 4.5 and there is no significant trading pattern apart from a gradual decline closer to the announcement date. Closer to the announcement date there is a slight upturn in directors' trading volume for the days –5 to –2. That noted, for days –1 to 0, the absolute and relative volume of trades executed is lower than normal.

<< Insert Table 5 Here >>

The results thus support the conjecture that directors' trading activity is higher several weeks before the buy-back announcement (H2a). The increase in the number of directors trades for the event period from days –45 to –41 and the gradual decline in directors' trading volume from days –40 to –21 supports our notion that some directors trade several weeks prior the buy-back announcement to avoid detection by the regulatory authorities. While a significant abnormal increase in trading activity occurs for days –15 to –11; the periods following that from –10 to 0 report insignificant levels of abnormal director trading and in most cases it is lower than normal. Overall, while there is some support for a decrease in directors' trading activity in the period immediately before the share buy-back announcement (H3a) it is equivocal. The non-parametric results are consistent with the parametric findings.

After the buy-back announcement, significant positive abnormal directors' trade activity is evident for days 6 to 10, 16 to 20 and 36 to 40 (Table 5). Directors partially refrain from trading in the immediate period surrounding the announcement and only trade actively at a significantly abnormal level from day 6 to 10 onwards. We note that these findings only provide a rough picture of directors' trading patterns around share buy-backs announcements. Observing only the total volume traded by directors, we are unable to determine the type of transaction namely purchases/sales and whether executive/non-executive directors execute the trades. Therefore to make our analysis more meaningful, we have partitioned the directors' trading activity into two main categories firstly directors' purchases/sales and secondly executive/non-executive trades. We now turn to these and other items.

5.5 Directors' Purchases/Sales Prior to the Buy-back Announcement

We analyse directors purchasing and selling patterns in order to investigate the possibility that directors are trading prior to buy-back announcement to maximize their personal interest. Directors' trading activity is split into whether the trades are purchases or sales (Table 6). In Table 6 Panel A, increases in directors' purchasing activity volume and the number of transactions undertaken by directors occurs for the period from day –45 to –41 and day –15 to –11 although not significant compared to normal activity. Overall, the increase in pre-announcement directors' trading activity in Table 6 is mainly a result from purchases by directors. Hence there is an *increase* in directors' *purchasing* activity in the period prior to the buy-back announcement supporting our previous postulate.

<< Insert Table 6 Here >>

Looking now at the directors selling patterns prior to the buy-back announcement, a significant increase in the number of shares sold in the period from day –15 to –2 is evident (Table 6 Panel B). Directors' selling activity is significant for the period from day –15 to –11 using the absolute trading volume and significant from day – 10 to –2 using the relative trading volumes. Furthermore, in terms of the frequency of directors' trades these are generally above the normal trading frequency over the full event period. We note that interpreting the directors' selling patterns is tricky because these sales may be motivated by reasons other than to profit from the buy-back announcement. While sales appear to

increase relative to pre-event period normal levels they are only significant for a couple of select periods. Once again the non-parametric test results in Table 6 are consistent with the parametric findings.

To summarize, we find evidence that directors' engage in significantly higher abnormal purchases prior to the buy-back announcement (H4a). However, contrary to our expectation there is some inclination but certainly not conclusive evidence that directors increase their selling activity (H5a). The possibility arises that directors maximize their personal wealth actively buying before a 'positive' buy-back announcement and selling prior to 'negative' buy-back announcement.

5.6 Directors' Purchases/Sales and Abnormal Returns

Given our interest in establishing the timing ability of insider traders a detailed analysis of the returns [±125] around actual insiders' trades that occur over the buy-back announcement event period [±50] are plotted for both purchases and sales respectively in Figures 2 and 3. The fact that insiders time their sales of stock is abundantly clear from Figure 3. Around the buy-back period directors' sales occur almost exactly *at the peak* of the price run at day 0 (the day of the trade), and subsequently there is a steady decrease of the abnormal cumulative price relative for the 125 days following the transaction. This is really an amazing result! The cumulative abnormal return behaviour around insiders' sales expose that insiders do indeed successfully time their trades. Not only do they time the sales but they also do so with almost total foresight as to how the future price will respond. This is positive evidence of either amazing clairvoyance, divine intervention or more likely a high degree of asymmetric information.

<< Insert Figures 2 and 3 Here >>

Timing of the insiders' purchases in Figure 2 is almost, but not quite, as impressive as that for the sales in Figure 3. Over the 125 days prior to the purchase (day 0), the mean market and size-decile adjusted cumulative price relatives consistently fluctuate around the price relative of 1 (0% cumulative abnormal returns). Following the purchase there is a distinct upward trend in the abnormal cumulative price relatives, which continues over the full 125-day window presented in Figure 2. CARs are of the order of 7-11% for the post trade 125-day period. Interestingly, the timing of the insider purchases is related to the abnormal rather than the raw return, as the raw CARs are a positive 6% for the pre-trade period.

Figures 2 and 3 indisputably confirm the expectations noted previously. While directors' *purchases* are not influenced by or related to *pre-transaction* abnormal returns as they fluctuate around zero this is not seen as crucial in illustrating the timing ability of the insiders. On the contrary directors' sales take place after substantial rises in abnormal returns (H6a). Further, directors' *purchases/sales* transactions in securities around the buy-back period are associated with substantial and significant negative/positive *post-transaction* abnormal returns (H7a). All of the above highlights the substantial and successful timing ability of insiders over the buy-back period. The implication for trading strategies is self-evident. It pays to watch what the insiders are doing both with purchases

and sales. Not only do insiders have superior inside knowledge about the upcoming repurchase and its value they are able to time their transactions to take advantage of other information as well. Quite simply – follow the 'smart money' that's where the abnormal return is.

5.7 Information Hierarchy

The trading activity of executive and non-executive directors is used to examine whether there is an insider information hierarchy. First, a significant increase in the absolute volume of shares traded by *executive directors* for the period from day-45 to –41 and –15 to –11 (Table 7 Panel A) is found. Second, both our relative volume and frequency of directors' trading measures reveal significant volume traded for the –45 to –41 days. This finding is consistent with previous studies (Nunn et al., 1983) that observed executive directors trading actively several weeks before corporate announcements. Third, in the period following this until Day –15 to -11, and although we note there is a sudden jump in the volume of trades transacted by executive directors for day –15 to –11, overall the absolute and relative frequency of (abnormal) trades and the number of transactions declines. One explanation here is that directors are trading in large blocks for select periods but this is unlikely. Finally, on the whole all executive directors seem to avoid trading in the immediate period, days –10 to +5, surrounding the buy-back announcement (Table 7 Panel A). The fact that executive directors refrain from trading in the immediate period prior to the announcement is in accord with the Park et al. (1995) argument that they do so to avoid regulatory scrutiny (H8a).

<< Insert Table 7 Here >>

On the other hand, for non-executive directors we observe a significant increase in the relative volume of shares traded in the immediate period surrounding the buy-back announcement. Non-executive directors are actively trading in the event period from day –10 to –6 and day 1 to 5 (Table 7 Panel B). In addition, over the periods from day –50 to day –11, non-executive directors trading pattern were generally insignificant. Table 7 results support our theory that there is a hierarchy in relation to inside information (H9a). For posterity we again note that the Table 7 results are (non)significant as the case may be regardless of whether they are computed using parametric or non-parametric tests.

It seems very likely that non-executive directors who are not involved in the daily operations of the firm only receive information of the share buy-back later than the executive directors and much closer to the buy-back the announcement. This accounts for the decrease in abnormal trading of executive directors in the immediate period around the buy-back and the increase in trading of the non-executive directors. In short there is good evidence that a hierarchy of inside information occurs with non-executive directors at the bottom of the insider 'information chain'. It is preferable to rely on the trades of executive directors as a means to identify the signal positive/negative signal.

5.8 Signalling Issues

The increase in both the purchasing and selling activity as well as the ability of directors to time their trades around the buy-back event has already been demonstrated. The signalling impact of the undervaluation motive in the buy-back as well as any directors' trade position, are both important aspects in the buy-back. First we now divide the sample into whether undervaluation is explicitly stipulated as a motive (Table 8 Panel A). Firms that signal undervaluation have a CAR of 3.5% over the immediate announcement period [-2, +2] which is higher than the 2.1 % for firms that do not signal undervaluation. This difference continues and is accentuated for the longer horizon period(s) on and after the announcement [-2, +20] and [-2, +50]. Evidently, the capital market takes into account the buy-back motivation and reacts accordingly. The fact that a motive of undervaluation is noted provides a cue that the market will interpret the buy-back as more 'favourable' and greater abnormal returns occur on, and post, the announcement (H10a).

<< Insert Table 8 Here >>

We have already demonstrated (Table 2) that out of the 120 buy-back announcements with directors' trades 73 are net purchases, 24 are net sellers and the 23 remainder have no trades prior to the announcement. Once again net purchasing/selling firms are defined as those that had a net insider trade purchase/sale position in the 150-day period prior to the announcement. The net insider trade position is an aggregate of how all insiders view the firm, favourable or unfavourable, over the period leading up to the buy-back. Hence do directors purchase when they anticipate that that there are positive abnormal returns and sell when they anticipate a negative outcome from the buy-back? In addition is there any information in this event over and above the other undervaluation signalling mechanisms?

The short answer to this is – yes! The cumulative abnormal returns for the net purchasing firms and the net selling firms for the period ±20 days around the buy-back are given in Table 8 Panel B. Firms that have net purchasing activity (Table 8) substantially and significantly outperform firms that have net selling activity (Table 8) post-announcement confirming our original supposition (H11a). For the immediate buy-back announcement period [-2, +2] the signalling power of the net purchasing activity is evident (2.3 % CAR) but is not as powerful compared to the CAR (3.5%) and signalling power of the undervaluation motive. When we evaluate the returns over a longer period the incremental signalling power of the net insider purchasing activity position becomes apparent. Average CAR for the net inside buyers sample is 7.4% [-2, 20] vastly superior to the net sellers of –2.7%. The net purchasing activity post-announcement CAR for the [-2, 20] period translates to an annualized equivalent return of 210%. Consequently, on average 5.1% cumulative abnormal gain is achieved if one is prepared to go long in 'net purchases' and short 'net sellers' in equal amounts for the post-announcement period.[25] The CAR based on net inside purchases is 2.7%, superior to the CAR for the undervaluation motive buy-backs for the [-2, 20] period (3.5% for the [-2, 50] period). The incremental signalling power of

[25] One can only have a short position in select shares on the ASX. These are mainly large capitalization, highly liquid stocks that have been given approval for such trading and the short position must be settled within a period of 3 days so the full gains of the strategy presented may not be obtainable.

the insider trades is thus confirmed for the period up to 50 days post the buy-back announcement.

Our result in relation to the net insider purchases/sales is similar to that of John and Lang (1991) for dividend announcements and Raad and Wu (1995) for open market repurchases in the US. These studies found that insiders were able to identify correctly and trade on favourable announcements. The obvious inference is that net insider position is useful in identifying potential market response after the buy-back announcement.

6. Summary and Conclusions

Overall we have identified and empirically tested a number of items in relation to the announcements of share buy-backs. First the capital market response to share buy-backs over the short term announcement period is generally positive. This response is positive for all types of buy-backs in Australia: on-market, equal access and selective. This is contrary to the US results where targeted repurchases, the equivalent of selective buy-backs, have a negative reaction.

Second, we turn to directors' trading activity and identify an increase in the overall level of insiders' trading activity several weeks prior the buy-back announcement. However, somewhat to our surprise in the period immediately before the buy-back announcement the level of director trading activity does not decrease as one would expect if directors are concerned about the threat of public and regulatory scrutiny and accordingly the potential costs of trading increase closer to the event period. The explanation for this lies in the behaviour of executive and non-executive directors and the information hierarchy that exists between these groups. Non-executive directors trade in the immediate period to the buy-back announcement, as they receive information later and closer to the announcement date. Executive directors are more aware of the public and legislative scrutiny that occurs closer to the announcement date of news sensitive events so they can and prefer to trade beforehand to minimise any potential costs from insider trading.

Generally, directors are net purchasers of shares and increase their purchases above normal levels in the period leading up to the buy-back announcement. One would logically expect this given that the buy-back for the most part is viewed as a favourable and positive event. An incentive thus exists for directors to use inside information in their possession to their advantage and in the process earn positive abnormal returns. At the very least, as is pointed out by Penman (1980), even if they are not interested or prohibited from selling or reversing their trade position later they can still use the information to time their trades and gain an advantage. Our results provide direct and highly persuasive evidence that directors actually time their trades over the buy-back announcement period to take advantage of not only information about the buy-back but other inside information as well. Directors' *purchases/sales* transactions in securities around the buy-back period are associated with substantial and significant positive/negative *post-transaction* abnormal returns. Furthermore, directors' sales take place after substantial rises in *pre-transaction* abnormal

returns. Insiders demonstrate substantial and successful timing ability over the buy-back period.

The scenario thus unfolds in that insiders are trading and by implication signalling so as to discriminate between perceived potential favourable and non-favourable buy-back announcements. Firms with *net* insider *purchasing/selling* activity in the period prior to the buy-back announcement thus experience a *greater/lower* level of post-announcement abnormal returns.

In conclusion, it pays to follow insider trading behaviour for both purchases and sales over the period before and after buy-back announcements. Not only do insiders have superior knowledge about any upcoming repurchase and its potential value they are also able to time their transactions to take full advantage of any proprietary information over the buy-back period. Our results confirm even if managers do not initiate the buy-back with a mindset of enhancing their own self-interest they certainly use superior information to divert some of the associated abnormal gains to their advantage. Our study has successfully shed light on how directors in the unique buy-back environment characteristic of the Australian market are able to take advantage of potential buy-backs gains and have a personal wealth interest in buy-back activity.

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Table 1: Descriptive Statistics: Category and Industry Breakdown of All Share Buy-back Announcements; Jan 1996 to Dec 2000.

Panel A of the table reports the number of share buy-back announcements (On-Market, Selective and Equal Access) made by all ASX listed firms on a year-by-year basis and for the total period from January 1996 to December 2000. Panel B of the table reports the number of share buy-back announcements (includes On-Market, Selective and Equal Access) made by all ASX listed firms based on an industry (ASX) Classification over the period from January 1996 to December 2000.

Panel A – Buy-backs by Category Type

Years	On Market	Selective	Equal Access	Total
1996	**31**	**6**	**3**	**40**
1997	**51**	**5**	**4**	**60**
1998	**82**	**10**	**3**	**95**
1999	**71**	**7**	**3**	**81**
2000	**65**	**8**	**9**	**82**
Total	**300**	**36**	**22**	**358**

Panel B – Buy-backs by Industry

Industry Subgroup	ASX Code	Frequency	Industry Subgroup	ASX Code	Frequency
Gold	1	27	Retail	13	26
Other Metals	2	13	Transport	14	1
Solid Fuels	3	8	Media	15	9
Oil and Gas	4	6	Banks and Finance	16	26
Diversified Resources	5	2	Insurance	17	1
Developers and Contractors	6	22	Entrepreneurial Investors	18	3
Building Materials	7	28	*Investment and Financial Services*	*19*	***80***
Alcohol and Tobacco	8	7	Property Trusts	20	3
Food and Household	9	3	Miscellaneous Services	21	8
Chemicals	10	3	*Miscellaneous Industrials*	*22*	***53***
Engineering	11	8	Diversified Industrial	23	13
Paper and Packaging	12	3	Tourism and Leisure	24	5

Table 2: Descriptive Statistics of All Share Buy-back Announcements; Jan 1996 to Dec 2000.

The table reports the number of share buy-back announcements by ASX listed firms according to: the quintile ranking of the firms based on size, the percentage of shares the firm announces it intends to buyback, actual stated buy-back motivation, the net directors' trade position prior to the announcement and whether the announcement relates to an extension or an initial buy-back event. Size quintiles are determined using the firm's market capitalization relative to other firms on the ASX SPPR database in the period prior the buy-back announcement. Percentage of shares intended to be bought back is obtained from the ASX forms submitted. In some instances, firms do not state a figure. The buy-back motivations are obtained from the ASX forms and firms thereby distinguished according to their intention to signal undervaluation or some 'other' motivation. Directors' trades prior to the announcement are used to identify firm's whose director's are net purchasers or net sellers in the period [-150, 0] prior to the announcement. The total of net insider trades does not amount to 358 as some firms do not have any director's trades. Buy-back announcements where firms have previously immediately finished a buy-back period are identified as effectively extensions to a previous initial buy-back.

Panel A – Number of Buy-backs by Firm Size and Percentage Announced

		Size Quintile Rank at Announcement					***Intended Percentage of Shares Announced for Buy-back***					
		(Large)				*(Small)*		*2.5 % to*	*5 % to*	*7.5 % to*	*Above*	
Years	*n*	*1*	*2*	*3*	*4*	*5*	*0% to 2.5%*	*5 %*	*7.5%*	*10%*	*10%*	*Not Stated*
1996	40	7	13	16	3	1	3	7	2	15	13	0
1997	60	13	18	25	2	2	7	21	6	14	12	0
1998	95	37	22	25	7	4	17	18	12	36	12	0
1999	81	33	18	19	5	6	17	20	11	25	7	1
2000	82	4	18	18	3	2	16	23	11	22	9	1
Total	**358**	**131**	**89**	**103**	**20**	**15**	**60**	**89**	**42**	**112**	**53**	**2**

Panel B – Number of Buy-backs by Signalling Characteristics

		Stated Buyback Motivation		***Net Insider Trade Prior to Announcement***		***Buy-back Type***		
Years	*n*	*To Signal Undervaluation*	*'Other' Motivations*	*Net Purchaser*	*Net Seller*	*Initial Buyback Announcements*	*Buyback Extensions*	*Buybacks by Equity Investor Firms*
1996	40	19	21	5	1	24	3	13
1997	60	15	45	11	8	38	9	13
1998	95	19	76	22	7	76	14	5
1999	81	19	62	17	4	61	9	11
2000	82	16	66	18	4	72	5	5
Total	**358**	**88**	**270**	**73**	**24**	**271**	**40**	**47**

Table 3: Descriptive Statistics of Insider Trading Activity around Share Buy-back Announcements; Jan 1996 to Dec 2000.

The table reports that number of director trades that were executed around the respective 358 share buy-back announcements by ASX listed firms from January 1996 to December 2000. The table is subdivided into type of directors (executive or non-executive), transaction type (purchase or sale) and buy-back motivation (to signal undervaluation or otherwise). We spilt the directors' trades into periods before and after the buy-back announcement.

Panel A - Entire Event Period

		Type of Director		***Buyback Motivation***	
Type of Transaction	n	Executive	Non Executive	Signal Undervaluation	Others
Purchases	**227**	123	104	61	166
Sales	**87**	47	40	9	78
Total	**314**	170	144	70	244

Panel B - 150 Days Before the Announcement

		Type of Director		***Buyback Motivation***	
Type of Transaction	n	Executive	Non Executive	Signal Undervaluation	Others
Purchases	**100**	58	42	35	65
Sales	**42**	19	23	3	39
Total	**142**	77	65	38	104

Panel C - 50 Days After the Announcement

		Type of Director		***Buyback Motivation***	
Type of Transaction	n	Executive	Non Executive	Signal Undervaluation	Others
Purchases	**127**	65	62	26	101
Sales	**45**	28	17	6	39
Total	**172**	93	79	32	140

Table 4: Market Reaction to Share Buy-back Announcements and Sub-Categories; Jan 1996 to Dec 2000.

This table reports the average cumulative abnormal returns (CAR) surrounding the announcement of all share buy-backs and various categories. This table measures CAR of share buy-back announcements using the size-decile adjusted return employed by Lin and Howe (1990). Abnormal return is reported over days –20 to –3, -2 to +2 and +3 to +20 relative to the announcement day. CAR results are partitioned based on sub-categories namely (i) type of buyback, (ii) selection criteria, (iii) size-quintiles, and (iv) the stated proportion of shares intended to be bought back. CAR results for alternative specifications of the benchmark return namely (i) the value weighted market index and (ii) market model are provided for robustness in Panel E. Firms removing confounding events – provides the CAR omitting all firms that had any potential confounding announcement and information effect over the period ±20 days. Statistical significance of the variables is provided by the relevant *t*-statistics.

		Days Relative to Announcement					
		Day -20 to -3		*Day -2 to +2*		*Day +3 to +20*	
	n	*CAR (%)*	*t-statistics*	*CAR (%)*	*t-statistics*	*CAR (%)*	*t-statistics*
Panel A – Type of Buyback							
On Market	273	-0.21	-0.31	2.61	7.22***	0.72	1.05
Selective	31	3.21	1.01	1.76	1.05	5.55	1.76*
Equal Access	19	0.09	0.04	1.73	1.58	-1.52	-0.75
All Firms	323	0.80	1.16	2.48	6.81***	1.05	1.53
Panel B – Selection Criteria							
Initial Buyback Announcements	248	0.09	0.11	2.87	6.90***	1.68	2.14**
Buyback Extensions	38	-0.08	-0.11	0.31	0.74	-0.52	-0.65
Buybacks by Investment Trusts	37	0.64	0.37	2.11	2.29**	-1.56	-0.90
All Firms	323	0.80	1.16	2.48	6.81***	1.05	1.53
Panel C – Firm Size Quintile							
1 (Large Firms)	129	-0.29	-0.40	1.54	4.06***	0.26	0.35
2	85	1.92	1.79*	2.15	3.82***	0.99	0.93
3	89	-0.27	-0.15	3.43	3.61***	2.62	1.45
4	14	-7.48	-1.18	5.14	1.54	2.63	0.42
5 (Small Firms)	6	7.42	0.75	7.05	1.35	-7.76	-0.78
All Firms	323	0.80	1.16	2.48	6.81***	1.05	1.53
Panel D – Stated Proportion of Shares to be bought back							
0% to 2.5%	55	-1.787	-1.310	2.20	3.06***	-0.53	-0.39
2.5 % to 5 %	88	0.049	0.038	2.91	4.28***	-0.22	-0.17
5 % to 7.5%	37	-0.279	-0.124	0.96	0.80	-0.71	-0.32
7.5 % to 10%	99	0.414	2.266**	2.89	4.77***	2.49	2.17**
Above 10%	44	2.390	1.050	2.32	1.93*	3.84	1.69*
All Firms	323	0.80	1.159	2.48	6.81***	1.05	1.53
Panel E – Robustness Checks (Alternative Specifications)							
All Firms (Market Adjusted)	323	0.876	1.248	2.17	5.86***	0.67	0.96
Firms Removing Confounding Events	240	0.322	0.399	2.38	5.58***	1.05	1.30

*** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Table 5: Directors' Trading Around Buy-back Announcements [±50 Days]; Jan 1996 to Dec 2000.

The table reports directors' trades around share buy-back announcements from January 1996 to December 2000. The total average volume of shares traded (absolute and relative) and the total average number of transactions initiated by directors are reported for each trading period. Statistical significance of abnormal trading activity is provided by the relevant *t*-statistics, which compare the trading measures for the event period to the means and variances from the estimation period. The results for the natural logarithm of directors' trades were also computed as a robustness check but are not reported in the table as the results were qualitatively similar.

	Total Director's Trading Activity (All Trades)					
	ITS (Absolute)	***t*-statistics**	**RITS (Relative)**	***t*-statistics**	**ITF (Absolute)**	***t*-statistics**
Trading Period						
-50 to –46	271,095	-0.444	0.096	-1.034	3.5	-0.271
-45 to –41	1,173,879	2.348**	1.028	1.861*	6.0	1.265
-40 to –36	802,386	1.199	0.539	0.343	5.0	0.650
-35 to –31	356,297	-0.181	0.310	-0.370	5.0	0.650
-30 to –26	307,078	-0.333	0.463	0.105	4.0	0.036
-25 to –21	68,743	-1.070	0.081	-1.082	3.0	-0.579
-20 to –16	538,714	0.383	0.235	-0.602	4.5	0.343
-15 to –11	1,501,484	3.361***	0.197	-0.719	2.2	-1.070
-10 to –6	355,902	-0.182	0.946	1.606	4.0	0.036
-5 to –2	567,973	0.730	0.727	1.193	4.0	0.520
-1 to 0	68,383	-0.302	0.044	-0.396	3.3	1.079
1 to 5	239,549	-0.542	0.483	0.168	2.3	-0.988
6 to10	1,641,310	3.793***	0.378	-0.158	5.0	0.650
11 to 15	505,728	0.281	1.076	2.010**	4.3	0.189
16 to 20	985,342	1.765*	1.230	2.490**	5.0	0.650
21 to 25	119,703	-0.912	0.551	0.380	4.0	0.036
26 to 30	247,640	-0.517	0.489	0.186	4.3	0.241
31 to 35	623,301	0.645	0.479	0.154	4.0	0.036
36 to 40	1,808,145	4.309***	0.690	0.810	5.3	0.855
41 to 45	19,426	-1.223	0.010	-1.301	5.0	0.650
46 to 50	77,385	-1.043	0.250	-0.557	2.5	-0.886

*** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Table 6: Directors' Trading (Purchases/Sales) Around Buy-back Announcements [±50 Days]; Jan 1996 to Dec 2000.

The table reports directors' purchases/sales around share buy-back announcements from January 1996 to December 2000. The total average volume of shares traded (absolute and relative) and the total average number of transactions initiated by directors purchases/sales are reported for each trading period. Statistical significance of abnormal trading activity is provided by the relevant *t*-statistics.

Panel A	***Total Directors' Trading Activity (Purchases)***					
	ITS (Absolute)	***t*-statistics**	**RITS (Relative)**	***t*-statistics**	**ITF (Absolute)**	***t*-statistics**
Trading Period						
-50 to -46	286,560	-0.084	0.136	-0.713	3.0	-0.161
-45 to -41	1,041,351	2.490**	0.844	0.625	4.0	0.462
-40 to -36	792,386	1.641	0.481	-0.060	4.0	0.462
-35 to -31	433,266	0.416	0.465	-0.090	5.0	1.084
-30 to -26	311,528	0.001	0.484	-0.055	4.0	0.462
-25 to -21	67,407	-0.831	0.080	-0.819	3.0	-0.161
-20 to -16	202,094	-0.372	0.057	-0.861	3.5	0.150
-15 to -11	1,650,587	4.568***	0.199	-0.594	1.3	-1.251
-10 to -6	20,250	-0.992	0.105	-0.772	3.0	-0.161
-5 to -2	440,928	0.655	0.451	0.076	2.0	-0.378
-1 to 0	68,383	-0.191	0.044	-0.304	3.0	1.056
1 to 5	280,344	-0.105	0.454	-0.112	4.0	0.462
6 to10	161,042	-0.512	0.141	-0.704	3.0	-0.161
11 to 15	378,304	0.229	0.389	-0.235	4.5	0.773
16 to 20	828,766	1.765*	0.783	0.509	4.0	0.462
21 to 25	45,254	-0.907	0.438	-0.142	4.0	0.462
26 to 30	211,412	-0.340	0.381	-0.250	3.3	0.047
31 to 35	623,301	1.065	0.479	-0.066	4.0	0.462
36 to 40	1,979,839	5.691***	0.854	0.644	6.8	2.226***
41 to 45	24,160	-0.979	0.019	-0.933	5.0	1.084
46 to 50	42,730	-0.915	0.320	-0.365	3.0	-0.161

Panel B	***Total Directors' Trading Activity (Sales)***					
	ITS (Absolute)	***t*-statistics**	**RITS (Relative)**	***t*-statistics**	**ITF (Absolute)**	***t*-statistics**
Trading Period						
-50 to -46	4,070	-0.846	0.004	-0.890	1.0	-0.601
-45 to -41	149,873	-0.327	0.237	0.221	3.0	0.902
-40 to -36	10,000	-0.825	0.058	-0.632	1.0	-0.601
-35 to -31	81,277	-0.571	0.096	-0.450	3.0	0.902
-30 to -26	18,000	-0.797	0.010	-0.860	1.0	-0.601
-25 to -21	7,673	-0.833	0.003	-0.895	1.0	-0.601
-20 to -16	34,321	-0.738	0.092	-0.469	1.0	-0.601
-15 to -11	765,014	1.865*	0.066	-0.595	2.0	0.150
-10 to -6	335,652	0.335	0.841	3.109***	1.0	-0.601
-5 to -2	308,492	0.410	0.583	2.058**	3.0	1.173
-1 to 0	-	-0.344	0.000	-0.364	0.0	-0.541
1 to 5	107,300	-0.478	0.362	0.819	2.0	0.150
6 to10	3,072,446	10.084***	0.404	1.018	3.0	0.902
11 to 15	40,000	-0.718	0.042	-0.711	1.0	-0.601
16 to 20	486,366	0.872	0.692	2.396**	3.0	0.902
21 to 25	112,171	-0.461	0.169	-0.101	1.0	-0.601
26 to 30	232,500	-0.032	0.307	0.556	3.0	0.902
31 to 35	-	-0.861	0.000	-0.910	0.0	-1.353
36 to 40	3,843	-0.847	0.005	-0.884	2.0	0.150
41 to 45	532	-0.859	0.000	-0.909	1.0	-0.601
46 to 50	100,000	-0.505	0.164	-0.126	1.0	-0.601

*** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Table 7: Directors' Trading (Executive and Non-Executive) Around Buy-back Announcements [±50 Days]; Jan 1996 to Dec 2000.

The table reports directors' trades around share buy-back announcements from January 1996 to December 2000. The total volume of shares traded (absolute and relative) as well as the number of transactions initiated by directors are reported. Statistical significance is provided by the relevant *t*-statistics. Panel A/B provides the trading results of the executive/non-executive directors sub-samples, respectively.

Panel A	***Total Directors' Trading Activity (Executive Directors)***					
	ITS (Absolute)	***t*-statistics**	**RITS (Relative)**	***t*-statistics**	**ITF (Absolute)**	***t*-statistics**
Trading Period						
-50 to -46	286,337	-0.352	0.135	-0.811	2.0	-0.312
-45 to -41	2,000,782	4.011***	1.499	2.495**	5.0	1.661*
-40 to -36	801,435	0.959	0.539	0.168	4.0	1.003
-35 to –31	638,384	0.544	0.707	0.574	5.0	1.661*
-30 to –26	110,000	-0.801	0.305	-0.398	2.0	-0.312
-25 to –21	119,673	-0.777	0.127	-0.830	3.0	0.345
-20 to -16	124,147	-0.765	0.118	-0.853	4.0	1.003
-15 to -11	1,501,484	2.740**	0.197	-0.660	2.2	-0.181
-10 to -6	-	-1.081	0.000	-1.138	0.0	-1.628
-5 to -2	599,570	0.661	0.477	0.246	2.0	0.013
-1 to 0	93,965	-0.193	0.064	-0.301	3.0	1.322
1 to 5	60,982	-0.926	0.351	-0.288	3.0	0.345
6 to10	2,157,361	4.409***	0.421	-0.118	4.0	1.003
11 to 15	358	-1.080	0.001	-1.136	1.0	-0.970
16 to 20	819,299	1.004	0.893	1.026	3.0	0.345
21 to 25	156,521	-0.683	0.607	0.334	3.0	0.345
26 to 30	204,875	-0.560	0.375	-0.230	4.0	1.003
31 to 35	170,000	-0.648	0.414	-0.135	1.0	-0.970
36 to 40	1,947,825	3.876***	0.392	-0.188	3.7	0.784
41 to 45	7,090	-1.063	0.009	-1.116	2.0	-0.312
46 to 50	38,743	-0.983	0.228	-0.585	2.0	-0.312

Panel B	***Total Directors' Trading Activity (Non Executive Directors)***					
	ITS (Absolute)	***t*-statistics**	**RITS (Relative)**	***t*-statistics**	**ITF (Absolute)**	***t*-statistics**
Trading Period						
-50 to -46	4,104	-0.786	0.004	-0.959	2.0	-0.247
-45 to -41	81,638	-0.402	0.122	-0.209	4.0	1.070
-40 to -36	1,903	-0.797	0.000	-0.985	2.0	-0.247
-35 to -31	181,396	0.092	0.195	0.257	4.0	1.070
-30 to -26	313,134	0.745	0.272	0.750	3.0	0.411
-25 to -21	5,813	-0.777	0.001	-0.983	2.0	-0.247
-20 to -16	459,480	1.470	0.130	-0.155	2.0	-0.247
-15 to -11	-	-0.806	0.000	-0.986	0.0	-1.563
-10 to -6	355,902	0.957	0.946	5.047***	4.0	1.070
-5 to -2	230,112	0.495	0.315	1.218	2.0	0.066
-1 to 0	2,610	-0.310	0.001	-0.390	1.5	0.362
1 to 5	326,662	0.812	0.465	1.981**	4.0	1.070
6 to10	32,000	-0.648	0.048	-0.680	3.0	0.411
11 to 15	390,634	1.129	0.394	1.527	4.0	1.070
16 to 20	329,016	0.823	0.484	2.099**	3.5	0.741
21 to 25	904	-0.802	0.000	-0.986	2.0	-0.247
26 to 30	165,669	0.014	0.329	1.113	3.0	0.411
31 to 35	453,301	1.439	0.064	-0.576	4.0	1.070
36 to 40	286,428	0.613	0.516	2.306**	4.0	1.070
41 to 45	12,336	-0.745	0.001	-0.979	3.0	0.411
46 to 50	110,013	-0.261	0.263	0.693	3.0	0.411

*** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Table 8: Market Reaction to Buy-back Announcements based on Signalling; Jan 1996 to Dec 2000.

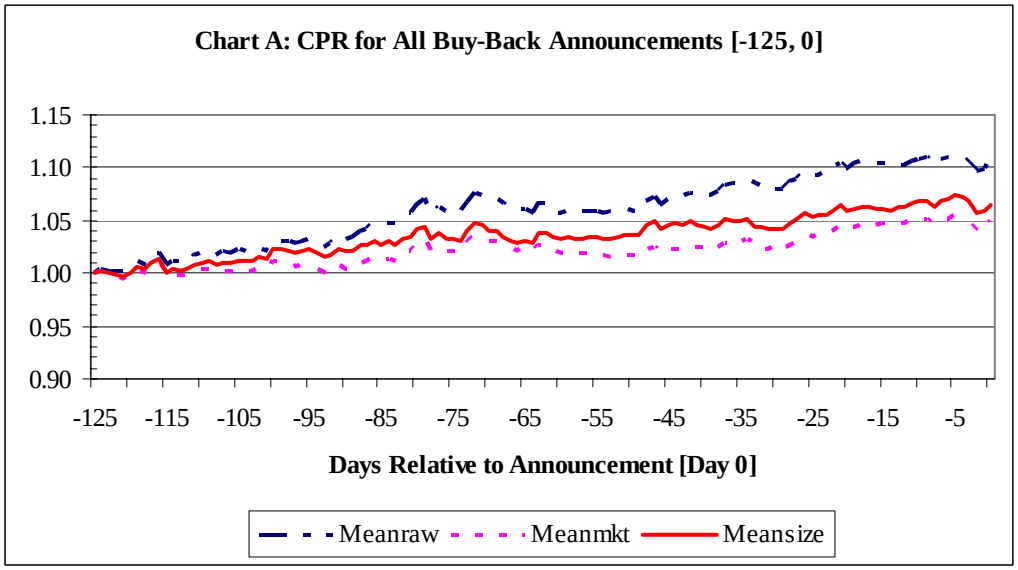
This table reports the average cumulative abnormal returns (CAR) surrounding the announcement of all share buy-backs and various categories. This table measures CAR of share buy-back announcements using the size-decile adjusted abnormal return measure employed by Lin and Howe (1990). Abnormal return is reported over days –20 to –3, -2 to +2 and +3 to +20, -2 to +20 and -2 to +50; all relative to the announcement day. The table is subdivided into two sub-categories namely Panel A – stated motivation for the buy-back and Panel B – net insider trading position prior to the announcement.

		Days Relative to Announcement									
		Day -20 to -3		*Day -2 to +2*		*Day +3 to +20*		*Day -2 to +20*		*Day -2 to +50*	
	n	*CAR (%)*	*t-statistics*	*CAR (%)*	*t-statistics*	*CAR (%)*	*t-statistics*	*CAR (%)*	*t-statistics*	*CAR (%)*	*t-statistics*
Panel A – Stated Motivation for Buy-back											
To Signal Undervaluation	77	-0.11	-0.07	3.49	4.13***	1.24	0.77	4.72	2.61***	4.96	1.81*
Not to Signal Undervaluation	246	0.21	0.26	2.13	5.25***	1.00	1.27	3.16	3.57***	3.53	2.63***
All Firms	323	0.80	1.16	2.48	6.81***	1.05	1.52	3.53	4.53***	3.87	3.27***
Panel B – Net Insider Trading Position											
Net Purchasers	70	-0.93	-0.61	2.33	2.91***	5.04	3.32***	7.38	4.29***	8.43	3.23***
Net Sellers	24	-0.24	-0.11	-0.44	-0.38	-2.30	-1.03	-2.74	-1.09	-4.89	-1.28
All Firms	323	0.80	1.16	2.48	6.81***	1.05	1.52	3.53	4.53	3.87	3.27

*** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Figure 1: Market Reaction [±125, days] Around Buy-back Announcements; Jan 1996 to Dec 2000.

The figure provides the cumulative price relative (CPR) surrounding the buy-back announcement [±125 days]. Chart A shows the CPR results for the period prior to the buy-back announcement [-125, 0] and Chart B the period after the buy-back announcement [0, +125]. *Meanraw* refers to the mean raw price relative, *Meanmkt* refers to mean price relative compared to the market price relative benchmark. *Meansize* is the mean price relative compared to the size-decile portfolio price relative benchmark. Size-decile adjusted price relatives are computed using the approach employed by Lin and Howe (1990) of comparing each price relative of the announcing firm to the benchmark portfolio price relative based on the appropriate size decile.



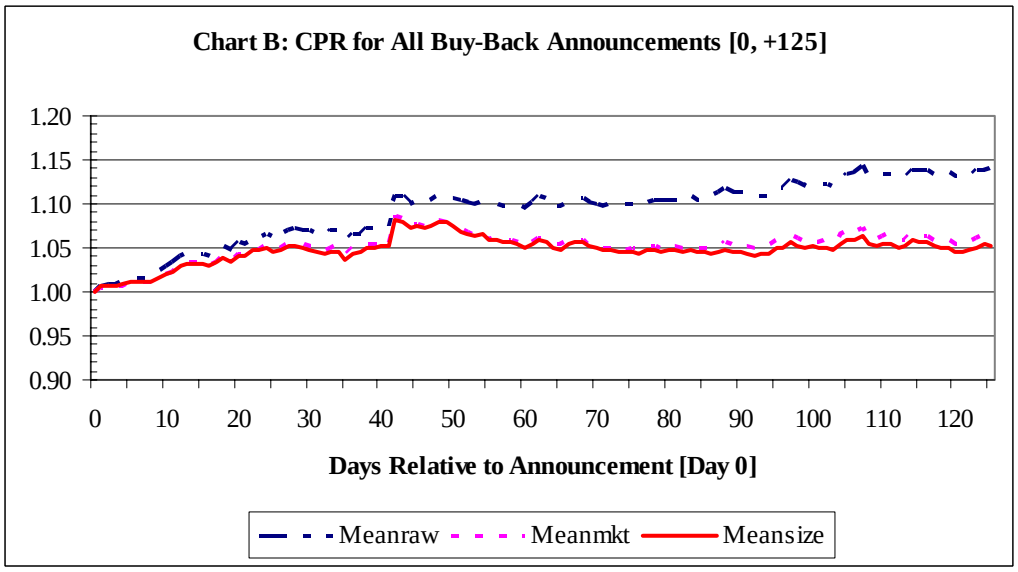
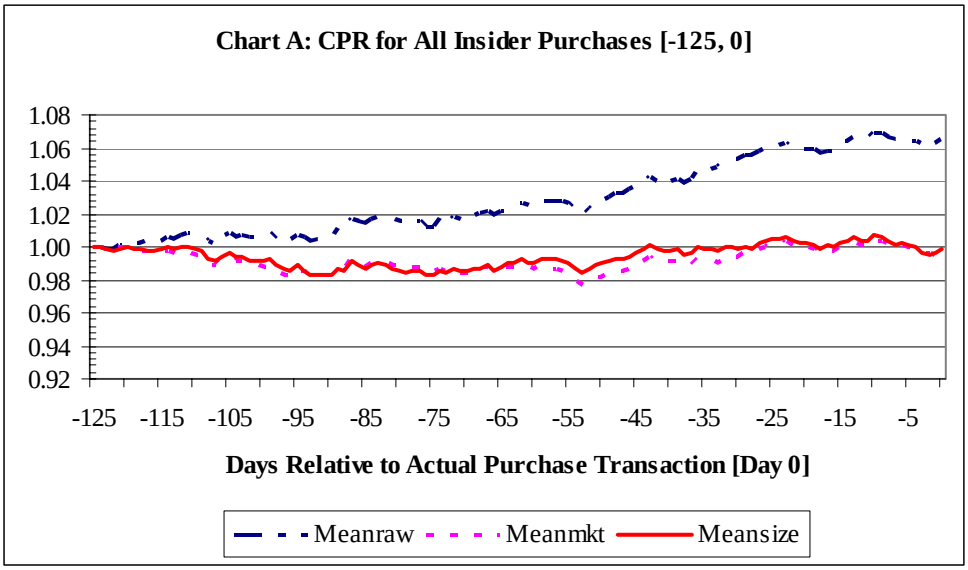


Figure 2: Market Reaction [±125 days] Around Directors' Purchases [±50 days] Associated with Buy-back Announcements; Jan 1996 to Dec 2000.

The figure provides the cumulative price relative (CPR) [±125 days] for all directors' purchases [day 0] conducted over the buy-back announcement period [±50 days]. Chart A shows the CPR results for the period prior to the directors' purchases [-125, 0] and Chart B the period after the directors' purchases [0, +125]. Day 0 is the day of the directors' purchases. The figure thus gives an insight into the timing ability of directors' purchases over the buy-back event period environment. *Meanraw* refers to the mean raw price relative, *Meanmkt* refers to mean price relative compared to the market price relative benchmark. *Meansize* is the mean price relative compared to the size-decile portfolio price relative benchmark. Size-decile adjusted price relatives are computed using the approach employed by Lin and Howe (1990) of comparing each price relative of the announcing firm to the benchmark portfolio price relative based on the appropriate size decile.



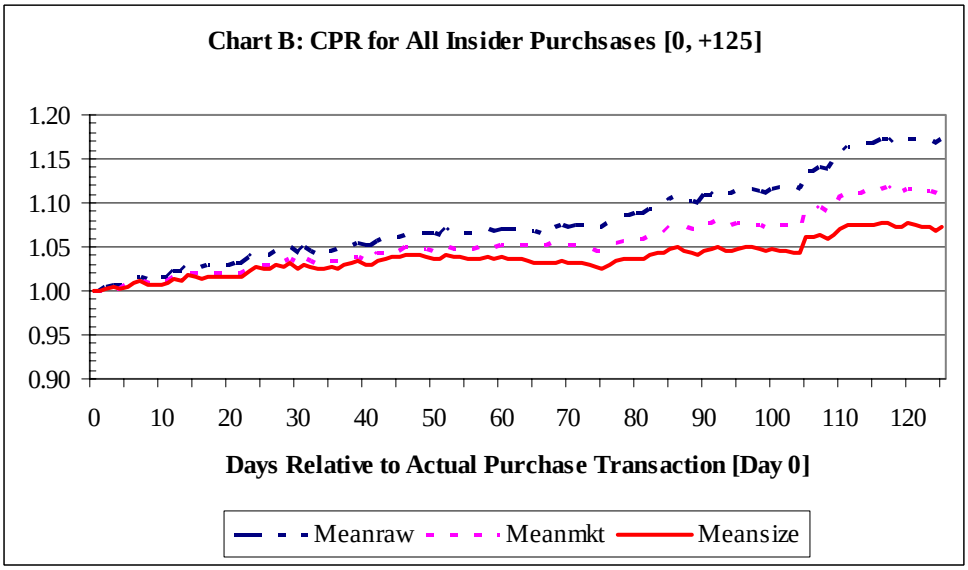


Figure 3: Market Reaction [±125 days] Around Directors' Sales [±50 days] Associated with Buy-back Announcements; Jan 1996 to Dec 2000.

The figure provides the cumulative price relative (CPR) [±125 days] for all directors' sales [day 0] conducted over the buy-back announcement period [±50 days]. Chart A shows the CPR results for the period prior to the directors' sales [-125, 0] and Chart B the period after the directors' sales [0, +125]. Day 0 is the day of the directors' sales. The figure thus gives an insight into the timing ability of directors' sales over the buy-back event period environment. *Meanraw* refers to the mean raw price relative, *Meanmkt* refers to mean price relative compared to the market price relative benchmark. *Meansize* is the mean price relative compared to the size-decile portfolio price relative benchmark. Size-decile adjusted price relatives are computed using the approach employed by Lin and Howe (1990) of comparing each price relative of the announcing firm to the benchmark portfolio price relative based on the appropriate size decile.