Private Placement and Share Price Reaction: Evidence from the Australian Biotechnology and Health Care Sector.

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Abstract

This paper analyses Private Placements for the Australian biotechnology sector. Private placement is one of the favoured methods of secondary equity offering around the world. However, it is also one of the least studied corporate financing mechanisms. A major issue around private placement is the impact of issuance to a selected group of institutional and/or high net worth sophisticated investors and the high direct costs of doing so. We first employ an event study methodology and identified that there exists substantial difference in the private placement effects in the short and long run for large and small private placement issues. We find significant negative cumulative abnormal return following private placements in the short term supporting the price pressure hypothesis with our sample and especially with the subgroup of large private placement issues. At the same time, we also find that the subgroup of small private placement issues exhibited a positive cumulative abnormal return. This is consistent with current empirical studies, where international evidence has had mixed results regarding the directional impact following private placements. We then hypothesize a model to measure and test the key factors identified in the literature. The model captures and explains strong medium term cumulative abnormal return effects and these effects are quite different between small and large placements.

Keywords: private placement, event study, price effect, price pressure

1.0   Introduction

The Australian Biotechnology industry is currently seen as a means to contribute significant national wealth for the future: the Australian Federal government has recently announced a spending program of AUD 500 million on medical and health research. Growth in the sector has been phenomenal in the last decade with the listed Australian Stock Exchange Healthcare and Biotech sector growth from 20 to 128[1] companies with a market capitalisation of AUD 27.6Billion as of July 2006. More are expected to list in the near future as a large segment (approximately 60%) of the industry still remains in private hands. Crowe (2003) reported that there are over 300 Australian companies focused on biotechnology and life science.

Sparing and Vitale (2004) reported that between the years 1998 to 2002 on average, an Australian biotechnology IPO firm raised AUD 10.5 million whilst an American biotechnology IPO firm raised on average USD 85 million (approximately AUD 113.3 million). Subsequent study by Yap and Lin (2006) reported an overall increase in the size of IPO issuance to AUD 22 million between the years 1999 to 2005. However, it still confirms the overall lack of scale and size of Australian biotechnology IPO by international standards. Given an estimated biotechnology product development and commercialization cost of between AUD 400-900 million (Gugliotti and Davidson, 2004), only a small fraction of the project cost were raise at the IPO stage.

Moreover, the majority of Australian biotechnology companies are in the early/middle developmental stage of product discovery and commercialization and are yet to make their first sale. Thus, with these companies' limited revenue generation ability and little access to bank loan and/or debt markets, their only viable business model is to deplete shareholders' equity followed by their frequent need to replenish equity losses by raising new equity. Therefore, successful future secondary capital raising is of vital importance to the survival and continued operations of Australian Biotechnology Companies. It also serves as a market signal in accordance with the concept of staged financing (Mayers, 1998). According to the concept, the optimal financing of a high risk firm such as biotechnologies with high clinical failures is to provide a limited

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[1] The data is obtained from *Bioshares*, a weekly publication providing market and company analysis of the Australian pharmaceutical and biotech industries.

amount of money at each stage of financing. As this money is about to run out and/or development obstacles have been cleared, investors and prospective financiers can then decide whether to provide more funds, and on what terms.

Unlike public offerings and rights offerings, private placements' post-issue resale regulatory environments are not consistent across the different international markets. For instance, in the U.S the resale of private placements can be restricted by Rule 144, which imposes a two year resale restriction. There may also be restrictions on the number of shares that may be resold[2] and to whom it may be sold[3]. Currently in Australia there are no restrictions on the immediate resale of shares purchased through private placements or restriction on the size of discount to market price at which an issue can be placed. The weaker regulatory environment governing private equity placements of the Australian markets can lead to the potential abuse by issuers and purchasers of discounted private placements to immediately on-sell for a profit. This may imply that there will be a downward price pressure on the share price post-issuance.

The remainder of the paper is organized as follows. Section 2 outlines the current hypothesis and reviews the empirical literature to date. In section 2 a number of hypothetical causality factors are identified for subsequent modelling. Section 3 describes the data and descriptive statistics. Section 4 outlines the methodologies. We first employ an event study methodology to separate out the large and small placement effects and short and long run effects. We then hypothesize a model to measure and test the key factors identified in section 4.2. Section 5 presents the empirical results. Section 6 concludes.

2.0   Literature Review

It is well known in corporate finance that firms time their equity issue to coincide with high equity prices (Baker, Stein, Wurgler (2003)). The rationale behind such market timing practices is supported by the underinvestment problem postulated by Myers and Maijluf (1984). Whereby firms will abstain from issuing equity and give

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[2] Number of shares sold in any three-month period must not exceed 1% of the number of shares outstanding or the average weekly volume of trading over the month before the sale. (Sheehan and Swisher (1998))

[3] Unregistered placements may initially only be traded among other high net value investors (Wruck, (1998))

up potential investment opportunities whenever the firm believe the share of existing assets transferred to new stockholders exceeds the share of increased firm value retained by existing stockholders. Graham and Harvey (2001) find that two-thirds of CFOs agree that "the amount by which our stock is undervalued or overvalued was an important or very important consideration" in issuing capital. Ritter (1991) and Loughran and Ritter (1995) also argue that shareholders and management will attempt to take advantage of "window of opportunity" in choosing when to issue equity.

Fenn, Liang and Prowse (1997) found that the private placement market as the fastest growing market in the financing of firms from 1980 to 1995 in the US. For instance, private equity placement accounted for $25 billion out of $85 billion of all stock issued on the U.S market in 1994 (The Federal Reserve Bulletin (1996)). However, the private equity placement is among the least-studied methods of corporate capital raising. Academic research papers in the US identify positive announcement reactions (Wruck (1989), Hertzel and Smith (1993); however, the market reaction is less clear in other international markets. Positive reaction is also found in Japan (Kato and Schallheim (1993)) and Sweden (Molin, 1996), no significant abnormal return was found in Singapore (Tan, Chng and Tong (2002) and New Zealand[4] (Anderson, Rose and Cahan, 2004), negative abnormal return announcement return was found in Singapore (Chen, et al (2002)). While Hou and Meyer (2002) investigated Australian rights issues and reported significant abnormal returns, no study to date has been examined private placements in Australia.

There is well-documented evidence of negative abnormal returns for short-term announcement effect following large price run-ups (Asquith and Mullins (1986), Masulis and Korwar (1986), Mikkelson and Partch (1986), Choe, Masulis, and Nanda (1993) and Bayless and Chaplinsky (1996)) and long-term (Loughran and Ritter 1997). Consequentially, investors shall be able to infer that companies that issue equity publicly are statistically overvalued. The literature on private placements however has provided mixed evidence in regards to both short-term announcement effect and long term returns.

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[4] Result based on the entire sample of private placement. When the sample is split, significant positive abnormal announcement effect was found for private placements issued at a premium. Those placed at a discount exhibits a significant negative announcement effect.

Existing studies on private equity offerings have identified several possible mechanisms that can have direct and indirect implications for the share market's reaction to private placement. These theories impact are discussed below and summarized in table 1.

Table 1

Academic Survey of Mechanisms effecting share price movement

Mechanism/Hypothesis	Private Placement
Price Pressure Hypothesis (Scholes, 1972)	-ve
Agency cost effect	
(i) Converging Interest (Jensen & Meckling, 1976)	+ve
(ii) Management entrenchment (Fama & Jensen, 1983; Morck, Shleifer & Vishny, 1988)	-ve
(iii) Monitoring and control effects (Wruck, 1989)	+ve
(iv) Insider opportunism	-ve
(v) Wealth redistribution between shareholders and bondholders (Galai & Masulis, 1976)	-ve
Information effect	
(a) Change in capital expenditure Value of current earning (Miller & Rock, 1985)	-ve
(b) Change in capital structure Decreasing in financial leverage (Ross, 1977; Healy & Palepu, 1990, Masulis, 1983)	-ve
(c) Change in ownership structure	
(i) Ownership fraction signal (Leland & Pyle, 1997)	+ve
(ii) Informed investors signal (Hertzel & Smith, 1993)	+ve

Basic financial theory such as CAPM assumes that there exists an infinitely elastic demand for equity[5]. Scholes (1972) suggested that as there are no perfect substitutes for any stock and so each stock would be unique. Thus, the demand curve will be downward sloping rather than horizontal and as such, all else equal, we should therefore expect new issues to increase the equity supply. With no post-issuance resale restriction on the Australian market; a negative stock market reaction to all

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[5] For example, CAPM implies that the price is a function exclusively of risk and expected return

types of equity offerings, whether public issues, rights issues, or private placement can be expected. Loderer and Zimmerman (1988) found that a 1% increase in the equity supply will lead to a 0.1% negative stock price reaction in the Swiss market. As the overall regulatory environment of New Zealand market is very similar to that of Australia, purchasers can be expected to take advantage of no post-issuance resale restrictions and immediately sell the new shares for an instant profit at the expense of less sophisticated investors. Based on the study of the New Zealand market by Anderson, Rose and Cahan (2006); where there exist nearly a ten-fold increase in volume traded for discounted private placements than private placements issued at a premium as well as a significant negative announcement effect.

There also exist strong theoretical and empirical evidence that demonstrate the occurrence of significant insider trading around various corporate event announcements, including equity offerings (Kahle (2000)), earnings announcements (Park, Jang and Loeb (1995)), dividend announcements (John & Lang (1991)), capital expenditure announcements (John & Mishra (1990) and merger announcements (Keown & Pinkerton (1981)). This coupled with the fact that in Australia there are no restrictions on the immediate resale restrictions for the private placements purchasers or limits on the size of discount to market price. Thus, potential abuses by issuers and purchasers to immediate on-sell at a profit will lead to an increase in the supply for the particular stock(s) and shift and alter the equilibrium price of the stock downwards over the short and medium term.

The literature is mixed in regard to the effect of information signalling effect of private placements. Wruck (1989) suggests that private placements may restore the problems due to information asymmetry. The purchase of a large fraction of the firm's shares by well-informed institutional and high net-worth private investors may send a credible signal of the firm's quality. Hertzel and Smith (1993) extends the suggestion that together with management's decision to forgo issue and the willingness of informed private investors to commit funds; will convey to the market the managements' belief that the company is undervalued. Ross (1977) also contends that an equity issue will serve as a positive signal of the value of shares. However, the signalling benefit also raises the prospect of false signalling. Tan, Chng and Tong (2002) found no support that private placements signalling firm undervaluation.

Akerlof's (1970, 2002) lemon principal suggests that high information asymmetry in the private placement market is more likely to attract overvalued firms. Therefore, if private placement signals undervaluation, overvalued firms can benefit by placing shares with investors who can resell prior to the realization of the firm's true value. In a related vein, Miller and Rock (1985) argues that private placement can be seen as a negative signal, for external financing are indicative of financial shortfalls in operating cash flow. As such it is signal of management's reduced cash flow expectations. Kang et al (1999) conflicts the lemon principal by arguing that firms are unlikely to be able to exploit the market in private placement because the investors that participate in these placements are well informed.

It is contended that the purchasers of private placements are sophisticated well-informed institutional and/or high net worth investors that have greater knowledge of the firm's future value prospects. Accordingly, Kirshnamurthy (2005) suggests that perhaps investors in the private placement market are buying the equity at the fair market value. In the same vein, Heinkel and Schwartz (1986) suggest that share issue prices signals firm quality and the deeper the discount the more negative the signal. Thus, when purchasers pay a premium, it signals that they believe that the stock is currently undervalued. A discount, on the other hand, indicates that the firm is currently overvalued and the deeper the discount the greater the overvaluation.

The agency theory implies that firm's agents (i.e. managements) can possess ulterior motives and pursue interests that differ from the best interests of the firm. Accordingly, the greater the divergence of interests between the agents and the firm the greater the agency costs. Jensen and Meckling (1976) convergence-of-interests hypothesis suggests that increases in percentage ownership held by management can serve to align the interests of agents and the firm. Thus, private placements that increase the ownership fraction can expect positive market reactions, while private placements that reduces managerial holding will lead to a negative reaction. Moreover, since investors in the private placements market are more sophisticated group and often buy a large fraction of the firm's shares, shareholders can all benefit from the potential monitoring and controlling of the firm's managers behaviours by these block investors (Wruck, 1989).

3. *Data*

3.1. Sample Selection

The preliminary step in the sample selection process was to identify all listed biotechnology and medical care, equipment and service equipment firms that engaged in secondary equity offerings between January 2004 and December 2004. Searches were conducted on the Aspect Huntley website containing historical individual company announcements to the ASX for all companies that have Global Industry Classification Standard (GICS) industry class as being pharmaceutical, biotechnology & life science and health care, equipment & services. The classifications of Biotechnology Company were extended to include companies listed in the health care, equipment & services sector. The rationale to incorporate the health care, equipment & services as biotechnology is because many of the companies listed within this sector are also engaging in the product development[6] with a biotechnology or life science focus. For the period under the study, 52 initial secondary equity raising events by 40 companies were observed.

Table 2

Sample Selection of Secondary Equity Offerings (SO) in 2004

This table presents the process and amount by which observations were selected for inclusion in the final sample for analysis. The ASX company announcement website and the GICS industry classification was used to formulate an initial list of events for the year 2004. Observations were then progressively removed according to the reasons stated in the table. The final sample yielded the candidate observation for which private placements was used. These observation were then cleansing to contain only the amount raised through private placement and subject of eventual analysis.

	No of Observations	Amount Raised
Initial Total	52	$326.51 M (61.83%*)
PO, RI & EO**	-6	-$43.6 M
SPP***	-5	-$31 M
Final Sample****	41	$251.91 M
PP proportion	-	$229 M
RI, EO, SPP with PP	-	$22.91 M

*This denotes the percentage of Secondary Equity Offering to the share of Total biotechnology Corporate Financing in 2004, inclusive of IPOs
**PO – Public Offerings, RI – Rights Issues, EO – Entitlement Offers.
***SPP – Shareholders Purchase Plan
****29 of the observations raised equity only thorough PP, 12 of the observation raised with PP combined with RI, EO and SPP

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[6] The product development includes development of endoscopy lens, safety syringes, ophthalmology devices, artificial heart devices etc.

Next the sample was screened to remove observations that may have introduced a potential bias to the result. All secondary equity offerings that did not involve private placements to institutional and/or high net worth sophisticated investors were removed. Table 2 provides a numerical overview of the sample selection process, with the final sample containing 41 observations. Finally, as 12 of private placements were done conjointly with other form of secondary offerings, it was cleansed to only contain the amount raised by private placement.

3.2.   Descriptive Statistics

Table 3
Summary Statistics for Private Placements in 2004

PP's Share of Biotechnology's Financing in 2004	43.37 %
PP's Share of Biotechnology's SO in 2004	70.14 %
Average Private Placement Size	$5.6 M
Mode & Median Private Placement Size	$3 M
Mean Issue Percentage	18.37%
No of Issue that exceeds the 12 month limit*	16**
Average Total Number of Trading days with Zero Return	46.78 days
Average Number of Trading days with Zero Return during the Estimation Period	27.12 days
Average Number of Trading days with Zero Return during the Event window	17.71 days
Average Number of Trading days with Zero Return due to No-Trading	12.95 days

*The ASX listing rule states that in any given 12 month period, PP over 15% of issue capital must obtain shareholders approval.
**This denotes the number of company that exceed the ASX listing rule for PP in just placement

Consistent with Fenn, Liang and Prowse (1997), it was found that private placement accounted for 43.15% of all biotechnology firms' corporate financing activities in 2004 and represented 70.14% of all secondary equity offering. The average size of the private placement sample was $5.6 million, however, with large dispersion and fat tails at either side of the distribution[7], mode and median of $3 million would be a much more meaningful measure. Of particular note is that, although no attempt was made to identify the number of company that exceeding the ASX listing rule regarding the 12 month private placement limit of 15% of issue capital, it was identified that the average size of private placement was 18.37% of issued capital and

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[7] 6 companies raised $10 M or more (total $114.7 M), 12 companies raised less than $2.1 M (total $14.75 M)

16 of the companies exceeded the limit in just one single issue. The largest issued of private placement issued 1.1297 times the total amount of Fully Paid Ordinary Shares (FPO). This signifies that shareholders' approval to exceed the 12 month limit is easily obtainable.

The non-synchronous and thin trading that exists on the biotechnology sector must also be highlighted. Of the total 166 days[8] used in the study, a total average of 46.78 days had zero return. 27.12 of those days also occurred during the estimation period which can contaminate the estimation period statistics used throughout the study. The 17.71 zero return days that occurred during the even window would also create a directional bias in the result. This effect may downward bias the estimated standard error in the estimation error.

4.0 Methodology

4.1 Event Study Methodology

An event study framework was utilized to investigate the private placement effect. Consistent with prior literature, the announcement date of the private placement (as opposed to the actual placement date) is taken as the event day for each sample observation, allowing the entire sample to be aligned in event time. Unfortunately, individual companies make their private placement announcement at their discretion, thus to give market participants sufficient time to review the contents of the announcement, adjustments are made to the determination of the event day. Applying the efficient market hypothesis, for companies that release their announcement prior to the market opening or during the intra-day trading time, the announcement date was used as the actual event day. For companies where the announcement are made after the market has closed, the trading day after was used as the event day.[9] All information is taken from the company announcement as they are lodged to the ASX. Prices and market variables are downloaded from the Bloomberg database. The specific methodologies applied to price data are described below.

To analyse the price effect of the private placement, the standard market model approach was employed as outline in Dodd & Warner (1983) and Brown & Warner

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[8] 166 days is made up of 100 days used to calculate the estimation period statistics, 5 pre-announcements days, 1 event day and 60 post announcement days.
[9] Most US studies use the trading day after the evening announcement, AD+1, as the event day.

(1985). Specifically, each sample observation was regressed against a market index using an ordinary least square (OLS) regression as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad (1)$$

where: R_{it} is the continuous return on the shares of firm i during period t;

R_{mt} is the continuous return on the market index[10] during period t;

α_i is the intercept for firm i; and

β_i is the slope coefficient (market beta) for firm i.

An estimation window of (-115, -16) was used for the above regression. The window was deemed appropriate considering that prior studies tended to use a similar size estimation window, and that 100 trading days strike a balance between accurately gauging a company's relationship to the market and incorporating too many firm specific trends that could bias the regression.

The alpha and beta of the market model were used to calculate the predicted returns of each observation over a range of event window, [(-15,+15) (-15.+30), (-15,+60), (-10,+15) (-10.+30), (-10,+60), (-5,+15) (-5.+30), (-5,+60)]. The Abnormal return (AR) for each event day was then calculated as the difference between the observed return and predicted return.

Next, the observations were segregated into different sub-sample groups. Standardized abnormal return (SAR) was aggregated across N firm for each sub-sample, giving the total standardized abnormal return (TSAR) for each event day.

$$\text{SAR}_{jt} = \frac{AR_{jt}}{\sqrt{s^2_{AR_{jt}}}} \qquad \text{and} \qquad \text{TSAR}_t = \sum_{j=1}^{N} SAR_{jt} \qquad (2)$$

where: SAR_{jt} is the standardized abnormal return for firm j in day t of the event window

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[10] Two indices were employed: the ASX 200 and the GICS Pharmaceutical index. Given the direction and magnitude was similar, the appropriate market index for each regression was determined to be the ASX 200, it is the universal market index, for comparative purposes.

AR_{jt} is the abnormal return for firm j in day t of the event window and

$S^2_{AR_{jt}}$ is the variance for firm j in day t of the event window

$TSAR_{tj}$ is the total standardized abnormal return for the sample on day t of the event window

j = 1 & N are the first and last firm, respectively in the sample sub group

Additional, to analyse the price effect over the event period, the total cumulative standardized abnormal return (TSCAR) was calculated:

$$\text{TSCAR}_N = \sum_{t=t_1}^{t=t_2} \text{TSAR}_t \qquad (3)$$

where: $TSCAR_N$ is the total standardized cumulative abnormal return over period N;

t_1 & t_2 are the first and last event days, respectively, of period N

All hypotheses were accepted or rejected according to the Z statistic, calculated as:

$$Z(TSAR) = \frac{TSAR_{tt}}{\sqrt{\sum_{j=1}^{N} \frac{D_j - 2}{D_j - 4}}} \quad \text{or} \quad Z(TSCAR) = \left(\frac{1}{\sqrt{N}}\right) \left(\frac{\sum_{T_1}^{T_2} TSAR_t}{\sqrt{(T_2 - T_1 + 1)}\left(\frac{D_j - 2}{D_j - 4}\right)} \right) \quad (4)$$

where: $TSCAR_N$ is the total standardized cumulative abnormal return over period N;

D_j = number of observed trading day returns for firm j over the estimation period

T_1 = earliest date in the event window

T_2 = later date in the even window

N = number of firm in the sample

4.2 Ordinary Least Square Methodology

The models developed here aim to identify the explanatory factors of private placement announcement returns and are tested using an ordinary least square regression framework. The following multivariate regression equation was used as the restricted model[11]:

$$\text{AR}_t \text{ or CAR}_{it} = \alpha_i + \beta_1 DUM + \beta_2 IPRI + \beta_3 IPER + \beta_4 SIZE + \beta_5 DIS + \varepsilon_{it} \qquad (5)$$

Where AR_t is equal to the raw abnormal return on day t and CAR is equal to the raw cumulative abnormal return as measured from day -5 to day t. DUM is the dummy variable for a large private placement issue that is above \$3 million. IPRI is the log of the issue price. IPER is the log of the issue percentage of the private placements. SIZE is the log of the market capitalization before the announcement date. DIS is the log of the discount which is measured by the issue price divided by the closing price on the day before the announcements. The significant difference between the groups classed as large and small private issue identified earlier was used as the foundation of the unrestricted model:

$$\text{AR}_t \text{ or CAR}_{it} = \alpha_i + \beta_1 DUM + \beta_2 IPRI + \beta_3 IPER + \beta_4 SIZE + \beta_5 DIS$$
$$+ \beta_6 IPRI\_B + \beta_7 IPER\_B + \beta_8 SIZE\_B + \beta_9 DIS\_B + \varepsilon_{it} \qquad (6)$$

Where IPRI_B is the log of the issue price multiply by the dummy variable. IPER_B is the log of the issue percentage of the private placements multiply by the dummy variable. SIZE_B is the log of the market capitalization before the announcement date multiply by the dummy variable. DIS_B is the log of the discount which is measured by the issue price divided by the closing price on the day before the announcements, multiply by the dummy variable.

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[11] Initial OLS had one additional independent variable, Issue Difference, being the log of the actual number of new shares issued over the announced number of new shares to be issued. This variable was removed as 34 of the observation had zero deviation between the actual versus announced.

5.0   Results

The statistical analyses and main results of this study are presented below. As highlighted earlier, calculations were performed using the ASX 200 as the universal market index and the Pharmaceutical Index[12] to examine the effect of the benchmark effect. The results that follow were similar and were not materially affected by this variation. Given the ASX 200 is the primary share market index it was chosen as the market index proxy. Alternative calculations were also undertaken using a range of different event windows to test for the sensitivity and robustness of the event. The direction of the results was similar and hence the most consistent event window of -5 to +60 was chosen (alternative results are not reported but available from the authors on request)

5.1   Event Study Results

Figure 1
Total Cumulative Abnormal Return Surrounding the Private Placement Announcement
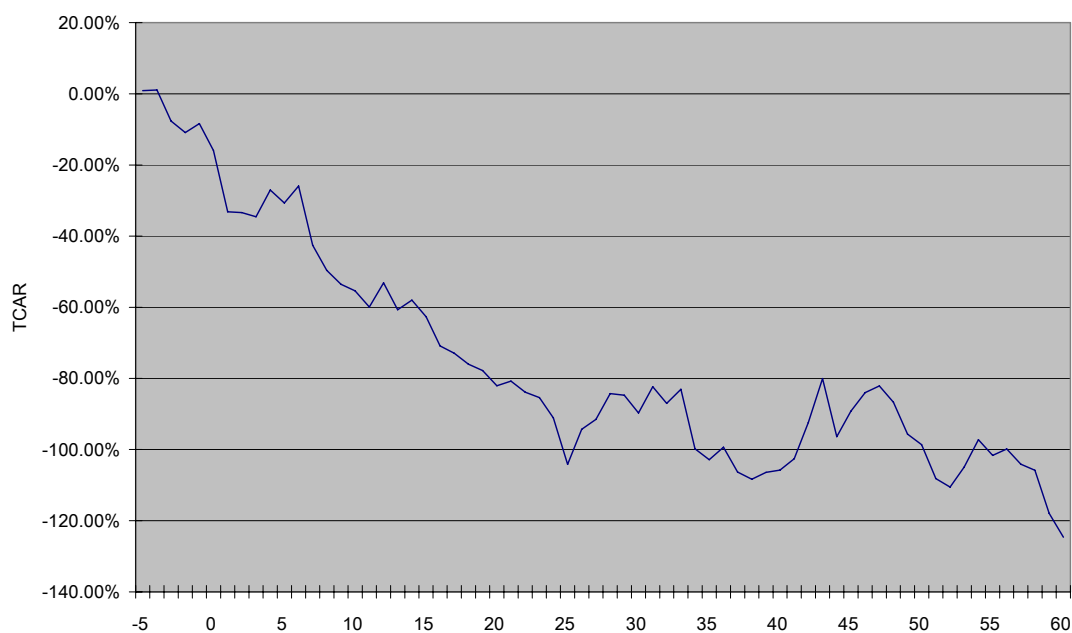
Appendix 1 summarises the price effect of private placement announcements over daily intervals. Figure 1 show the TSCAR for the entire sample during the event window. The TSAR at event day +1 experienced significant negative daily returns of -17.26%, with z statistics of -2.67 and achieving statically significant p value at the 1% level. Although, the result would be considerably more powerful had the event

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[12] Bloomberg code AS51PHRM

day TSAR also achieve statistical significance, it nevertheless recorded a TSAR of -7.51% on the event day. Day 7, 25, 34 and 44 were also significant at either the 1% or the 5% interval. The remaining days post the event day was statistically insignificant at the 5% threshold.

The TSCAR achieved statistical significance from day +8 onwards, the exception of day 12, 43, 45, 46, 47, 48, 54 and 56. However, as far as the price effect is concerned, these exceptions were rather insignificant given the TSCAR quickly achieve statistical significance the follow day(s). It is interesting that, although these results appear to be supportive of an obvious price effect, the price adjustment process is a gradual drift downwards in 25 days rather than a quick shift towards a new equilibrium price as observed in Figure 1. This gradual rundown in the returns subsequent to private placement announcements is in sharp contrast to all other private placement studies except for Kato and Schallheim (1993) and Anderson, Rose and Cahan (2006).

Figure 2
Large Issues by Mode's Cumulative Abnormal Return Surrounding the Private Placement Announcement

Appendix 2 summarises the price effect of large private placement announcements over daily intervals for the sub sample classed as a large issue above the modal value

of AUD 3 million, containing 23 observations. Figure 2 show the TSCAR for the entire sample during the event window. The TSAR at the event day +1 experienced significant negative daily returns of -17.47%, with z statistics of -3.61 and achieving statically significant p value at the 1% level. TSCAR achieve significance from event day +1 onwards till the end of the event window at the 1% level. Significantly, the result of this sample was considerably more powerful than the entire sample as can be observed from Figure 2, where there existed an almost straight downward slope and a TCSAR that was in excess of that of the sample. The result from this subgroup indicates the price pressure hypothesis does exist to robustly support the price effect following private placement.

Figure 3
Small Issues by Mode's Cumulative Abnormal Return Surrounding the Private Placement Announcement
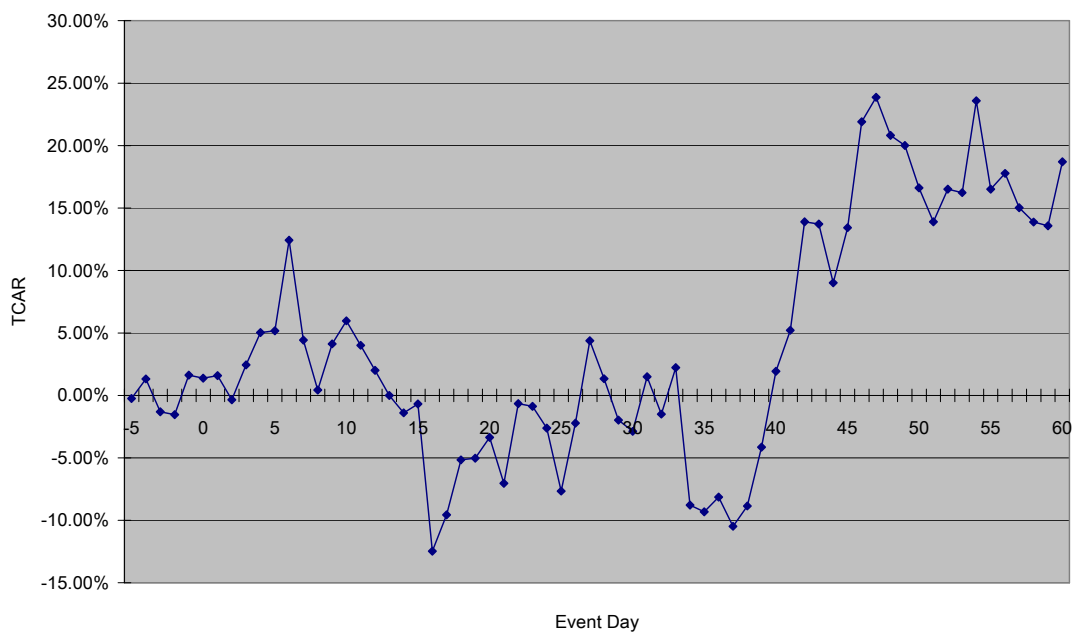
Appendix 3 summarises the price effect of small private placement announcements over daily intervals for the sub sample classed as a small issue, modal value of AUD 3 million or less, containing 18 observations. Figure 3 show the TSCAR for the entire sample during the event window. The TSAR only achieve significance on day 16, 34, 42 and 46 at the 5% level, and, interestingly, all other including days with close proximity to the event day remained statistically insignificant. Moreover, throughout the event period TSCAR for small issues remained statistically insignificant.

From Figure 3, it can be observed that following the event day, there was a sharp upward price movement followed by a price correction and volatile fluctuation before trending upwards at the end of the event window. It indicates that there are other forces affecting the price effect following private placement. More specifically, given the relative small size of the capital raising it can be inferred that it would only be sufficient for the short term given the expenditure needs of the product development. The injection of much needed capital would in fact be a favourable market information signal. As is the private placement of significant size of holding to institutional and/or high net worth, sophisticated investors and their ability to control and monitor management.

Other sub samples such the issuing characteristics of private placement only, or combined with other form of secondary offering, size of issue and percentage of issue were also used in the study. However, the contamination of mixing large and small size private placement issue reduced the power of the test given their opposite price effect and as such these results were not used for the purpose of this study.

5.2   OLS Regression Results

In line with earlier findings, the opposite effect on the share price post issuance between the large and small private placement groups resulted in the cross-contamination in the restricted model. As such the restricted model was a model with significantly less predicative power as compared to the unrestricted model, which can be observed from the adjusted R squared value. The unrestricted model was better suited in capturing and identifying the differing impact the independent variables had on the AR and CAR of the large and small private placement groups. This is illustrated by the F-test, where there were substantial difference between the large and the small private placements and especially in the short term with CAR+5, CAR+10 and CAR+20 achieving significance at the 5% level. Thus, the results of the unrestricted model need to be discussed in detail.

The intercept and the dummy variable in Table 4 and Table 5 show that following the announcement, the small and large group exhibits distinctly different paths. CAR results for the small private placement group displayed the same characteristics as the event study methodology, where, initially, the share price reaction were positive

CAR+1 to CAR+10, followed by some fluctuation from CAR+10 to CAR+30 before finishing strong upwards at CAR+60. CAR results for the large private placement group also affirm earlier event study finding as CAR trended consistently downward from CAR+1 onwards and were statistically significant at the 5% level from CAR+5 onwards.

Table 4 Regression Estimation Result

This table reports the results of estimating the restricted and unrestricted form models of the independent variables. The table reports OLS parameter estimates and p-value in parentheses. The table also reports a range of regression diagnostics including the adjusted R squared and the F test for the exclusion restrictions in the reduced model. DUM is the dummy variable for those companies that issued private placements above $3 million. IPRI is the log of the issue price. IPER is the log of the issue percentage of the private placements. SIZE is the log of the market capitalization before the announcement date. DIS is the log of the discount which is measured by the issue price divided by the closing price on the day before the announcements. IPRI_B is the log of the issue price multiply by the dummy variable. IPER_B is the log of the issue percentage of the private placements multiply by the dummy variable. SIZE_B is the log of the market capitalization before the announcement date multiply by the dummy variable. DIS_B is the log of the discount which is measured by the issue price divided by the closing price on the day before the announcements multiply by the dummy variable. AR+1 is the raw abnormal return on the day after the announcement. CAR is the raw cumulative abnormal return as calculated from Day_{-5} to the ending day as indicated.

Variable	AR_1		CAR +1		CAR +5		CAR +10	
	R	U	R	U	R	U	R	U
Intercept	-0.0604	-0.7289	-0.0467	1.1234	-0.3060	1.5125	-0.3459	1.5858
	(0.8681)	(0.1349)	(0.9437)	(0.2181)	(0.6916)	(0.1137)	(0.6818)	(0.1246)
DUM	-0.0146	1.1013	-0.0766	-2.3005	-0.0716	-3.5967	-0.0868	-4.4848
	(0.6317)	(.1901)	(0.1735)	(0.1474)	(0.2727)	(0.0328)**	(0.2246)	(0.0145)**
IPRI	-0.0219	-0.0056	-0.0032	0.0219	-0.0293	0.0322	-0.0651	0.1240
	(0.2760)	(0.8201)	(0.9288)	(0.6378)	(0.4889)	(0.5065)	(0.1643)	(0.8120)
IPER	0.0645	0.5078	0.1203	-0.2782	-0.0041	-0.7378	-0.0704	-0.6836
	(0.5229)	(0.0146)**	(0.5119)	(0.4572)	(0.9846)	(0.0641)	(0.7629)	(0.1010)
SIZE	0.0020	0.0395	0.0022	-0.0631	0.0165	-0.0819	0.0171	-0.0881
	(0.9211)	(0.1511)	(0.9522)	(0.2212)	(0.7031)	(0.1292)	(0.7181)	(0.1311)
DIS	0.0588	0.0485	-0.0181	-0.0918	-0.1130	-0.1359	0.0319	-0.1222
	(0.1322)	(0.2384)	(0.7959)	(0.2360)	(0.8897)	(0.0953)	(0.7209)	(0.1625)
IPRI_B	0	0.0059	0	-0.0478	0	-0.1158	0	-0.1725
		(0.8991)		(0.5870)		(0.2109)		(0.0882)
IPER_B	0	-0.4999	0	0.0664	0	1.1689	0	1.0446
		(0.0340)**		(0.1283)		(0.0126)**		(0.0363)**
SIZE_B	0	-0.0594	0	0.1253	0	0.1941	0	0.2430
		(0.1968)		(0.1500)		(0.0354)**		(0.0161)**
DIS_B	0	0.2416	0	0.6177	0	0.9055	0	1.0458
		(0.0971)		(0.0270)**		(0.0026)***		(0.0015)***
Adjusted R^2	0.1973	0.2172	0.0029	0.0872	0.0110	0.2793	0.1293	0.3799
F stats		2.0026		1.4459		3.4063**		3.6288**
Observations	41	41	41	41	41	41	41	41

**   denotes significance at the 5% level
***   denotes significance at the 1% level

Consistent with their diverging paths of return, it can be clearly observed that the impact of the selected impendent variables often had opposite effect on the CAR for the large and small groups. Issue price was the only variable that displayed similar price effect as the event study and the dummy variable findings. It exerted a small positive influence (ranging from 0.0161 to 0.1240) for the small group's CAR+1 up to

Table 5 Regression Estimation Result (Cont.)

Variable	CAR +20		CAR +30		CAR +60	
	R	U	R	U	R	U
Intercept	-0.8470	0.7571	-1.1819	0.6916	0.7601	4.6907
	(0.3836)	(0.5348)	(0.2138)	(0.5779)	(0.6612)	(0.0511)
DUM	-0.0722	-5.0093	-0.0981	-5.3593	-0.0740	-10.8712
	(0.3766)	(0.0228)**	(0.2190)	(0.0173)**	(0.6113)	(0.0108)**
IPRI	-0.0961	0.0161	-0.1121	-0.0340	-0.1800	-0.1559
	(0.0762)	(0.7983)	(0.0352)**	(0.5334)	(0.0643)	(0.2011)
IPER	0.0597	-0.2599	0.0714	-0.3608	-0.3692	-1.3168
	(0.8236)	(0.6060)	(0.7937)	(0.4833)	(0.4430)	(0.1783)
SIZE	0.0396	-0.0456	0.0585	-0.0452	-0.0536	-0.2812
	(0.4677)	(0.5082)	(0.2715)	(0.5201)	(0.5824)	(0.0393)**
DIS	-0.0435	-0.2241	-0.0229	-0.1735	0.0174	-0.1665
	(0.6707)	(0.0365)**	(0.8175)	(0.1070)	(0.9241)	(0.4034)
IPRI_B	0	-0.2801	0	-0.2300	0	-0.3349
		(0.0236)**		(0.0644)		(0.1476)
IPER_B	0	0.6491	0	0.7326	0	1.2913
		(0.2661)		(0.2193)		(0.2488)
SIZE_B	0	0.2694	0	0.2902	0	0.6014
		(0.0252)**		(0.0185)**		(0.0101)**
DIS_B	0	0.9839	0	0.7826	0	0.5786
		(0.0101)**		(0.0405)**		(0.4070)
Adjusted R^2	0.2330	0.4017	0.2940	0.3949	0.3088	0.3829
F stats		2.7737**		1.9660		1.6412
Observations	41	41	41	41	41	41

**   denotes significance at the 5% level
***   denotes significance at the 1% level

CAR+20 before reverting negative (-0.0340, -0.1559), whilst issue price had a consistently negative and widening impact on the large group's CAR (ranging from -0.0259 to -.4908) [13]. The findings above are consistent with Ritter (1991) and Loughran and Ritter (1995) "window of opportunity" argument whereby the management issues shares near price peaks and confirmed by this study where it was the only time that both groups displayed the same directional impact.

In contrast to the earlier results, the impact of all other variables, namely: issue percentage, size and discount on CAR, were all positive for the large private placement group and negative for the small private placement group. For the small group, given the smaller proceed from issuance and the annual cash burn of biotechnology companies, it will not last beyond the short term. Thus, the share price effect will be negatively correlated with the size of companies where cash burns can be expected to be higher for larger companies. Consistent with the insider

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[13] Issue price for large group is calculated by summation of I_PRI and I_PRIC_B.

opportunism hypothesis, the larger issue percentage and the greater the size of the discount, the more likely that it will lead to abuses by purchasers to immediately on-sell for a profit and cause a negative price effect. This is especially so, given Australia's lack of restriction on share trading post private placement issuance.

For the large group, the opposite effect will dominate and this is consistent with the informed investor signal hypothesis as proposed by Hertzel and Smith (1993): the willingness of the informed investors to commit substantial funds will send a positive and credible market signal. The high issue percentage and the large size of the company both mean that informed investors will have to commit more funds to purchase a higher percentage and/or a large company. Given the large size of issuance, larger discount also had a positive price effect. For the willingness of informed investors to invest and the management to compensate these informed investors' will act to alleviate the concerns of owning an Akerlof's (1970, 2002) "lemon". As such the management decision to forgo other form of capital raising will convey to the market the managements' belief that the company is undervalued.

It is interesting also to note that whilst significance at the 5% level was achieve for the large group at a number of observation points with the independent variables: issue percentage[14], size[15] and discount[16], their opposite effect are not the explanatory factors of negative and significant post private placement announcement price effect returns for the large group.

6.0   *Conclusion*

This paper has investigated the private placement effect on share price for companies as defined as Biotechnologies over the 66 days period surrounding the announcement to the market.

The results have indicated clear stock price effect around the announcement period. It was found that share prices the 1st day after the announcement was associated with significant negative abnormal returns for private placement of $3million or more.

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[14] Issue percentage for the large group was deemed significant at AR_1, CAR +5 and CAR +10
[15] Size for the large group was deemed significant at CAR +5, CAR +10, CAR +20, CAR +30, CAR +60
[16] Discount for the large group was deemed significant at CAR +1, CAR +5, CAR +10, CAR +20, CAR +30,

Furthermore, the continued persistent significant negative total cumulative standardized abnormal returns (TSCAR) even after 60 days following the announcement provides strong support for the price pressure hypothesis. Where the price effects are consistent with the notion that the demand curve will be downward sloping rather than horizontal and as such, private placements that increase the equity supply will have a negative impact.

Overall, the negative results are consistent with the notion that managers have taken full advantage of the "window of opportunity" in choosing when to issue their equity as well-informed institutional and high net-worth private investors will only be willing to commit funds at fair value. This can be viewed as a double edge sword. On the one hand, the price adjustment post private placement of mean reverting towards the new fair equilibrium price of the company can be interpreted as having a negative impact to the short term wealth of existing shareholders. However, on the other hand, new capital injections are of vital importance to the survival of the biotechnology companies. Thus, each successful private placement can also be interpreted as a validation signal by well-informed investors and management seizing the right opportunity in shoring up the depleting equity ensuring the continued operations for the product development and commercialization. Interpreting the positive TSCAR at day +60 by the subgroup deemed to be small private placements after an initial period of fluctuation. It is plausible to infer the existence of informed investors' signal given informed investors are less likely to invest in "lemons" and will also be able to exert better control and monitoring of the management and reduce the agency cost.

The regression results affirms the event study findings, where it can be observed that intercept for subgroup of small private placements and the dummy variable being the subgroup of large private placement issue size above $3M, are the definitive variables that will both separate and best explain the resultant share price reaction post private placement announcement. The other independent variables: issue price, issue percentage, size and discount also reaffirm the existence of informed investors' signal, improvement in the monitoring and control effect especially for the large private placements subgroup.

The number of listed biotechnology companies will continue to grow on the Australian Stock Exchange. It is also conceivable that the amount and the number of

private placements will expand several fold in the coming years. Further refinement of sub sample characteristics would add more power to the test as well the identification of more independent variables. Hence, continued investigation of this research is warranted in the future. One problem is the frequency and non-synchronous nature of thin trading as observed by the number of trading days with zero return. This is more pronounced in these small firms whose placement value is below the modal value. An emphasis on developing a revised event study methodology that will resolve the truncation bias in the middle will help to shed further light on the exact nature of the private placement effect on the Australian biotechnology sector. Additional, volume can also be used as an independent variable to capture the potential abuse of insider opportunism by purchasers of private placements.

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Appendix 1

Total Stock Price Effects Surrounding the Announcement of Private Placement

This table presents the stock price effects surrounding private placement announcements by biotechnology companies over the sample period of January 2004 to December 2004. The event day (Day 0) is defined as the actual date of announcement by the company. TAR is the total abnormal return of the cross-sectionally combined observations for the relevant event day. TSCAR is the total cumulative average abnormal return between day -5 and the relevant event day

Panel A: Daily Average Abnormal Returns

Event Day	TSAR	Z Statistic	p Value	TSCAR	Z Statistic	p Value
-5	0.9189	0.1420	0.8871	0.9189	0.1420	0.8871
-4	0.1585	0.0245	0.9804	1.0774	0.1178	0.9063
-3	-8.7504	-1.3526	0.1762	-7.6730	-0.6848	0.4935
-2	-3.1874	-0.4927	0.6222	-10.8603	-0.8394	0.4013
-1	2.4606	0.3803	0.7037	-8.3998	-0.5806	0.5615
0	-7.5073	-1.1604	0.2459	-15.9071	-1.0038	0.3155
1	-17.2560	-2.6673	**0.0076****	-33.1631	-1.9375	0.0527
2	-0.2165	-0.0335	0.9733	-33.3796	-1.8242	0.0681
3	-1.1823	-0.1827	0.8550	-34.5619	-1.7808	0.0750
4	7.4950	1.1585	0.2467	-27.0668	-1.3230	0.1858
5	-3.6126	-0.5584	0.5766	-30.6794	-1.4298	0.1528
6	4.7684	0.7371	0.4611	-25.9110	-1.1562	0.2476
7	-16.6591	-2.5750	**0.0100****	-42.5701	-1.8250	0.0680
8	-7.0423	-1.0885	0.2764	-49.6125	-2.0495	**0.0404***
9	-3.9299	-0.6075	0.5436	-53.5423	-2.1369	**0.0326***
10	-1.8423	-0.2848	0.7758	-55.3847	-2.1402	**0.0323***
11	-4.5492	-0.7032	0.4819	-59.9338	-2.2469	**0.0246***
12	6.7831	1.0485	0.2944	-53.1507	-1.9364	0.0528
13	-7.5378	-1.1651	0.2440	-60.6885	-2.1521	**0.0314***
14	2.6941	0.4164	0.6771	-57.9944	-2.0045	**0.0450***
15	-4.6624	-0.7207	0.4711	-62.6568	-2.1134	**0.0346***
16	-8.1801	-1.2644	0.2061	-70.8369	-2.3344	**0.0196***
17	-2.1038	-0.3252	0.7450	-72.9407	-2.3509	**0.0187***
18	-3.0473	-0.4710	0.6376	-75.9880	-2.3976	**0.0165***
19	-1.8016	-0.2785	0.7806	-77.7896	-2.4048	**0.0162***
20	-4.2615	-0.6587	0.5101	-82.0511	-2.4873	**0.0129***
21	1.3237	0.2046	0.8379	-80.7274	-2.4014	**0.0163***
22	-3.1454	-0.4862	0.6268	-83.8728	-2.4500	**0.0143***
23	-1.4935	-0.2309	0.8174	-85.3663	-2.4503	**0.0143***
24	-5.7366	-0.8867	0.3752	-91.1029	-2.5710	**0.0101***
25	-13.0653	-2.0195	**0.0434***	-104.1682	-2.8919	**0.0038****
26	9.8459	1.5219	0.1280	-94.3223	-2.5773	**0.0100****
27	2.8035	0.4333	0.6648	-91.5188	-2.4625	**0.0138***
28	7.2760	1.1247	0.2607	-84.2428	-2.2332	**0.0255***
29	-0.4658	-0.0720	0.9426	-84.7085	-2.2132	**0.0269***
30	-5.0206	-0.7760	0.4377	-89.7291	-2.3116	**0.0208***
31	7.3780	1.1404	0.2541	-82.3511	-2.0927	**0.0364***
32	-4.6790	-0.7232	0.4695	-87.0301	-2.1823	**0.0291***
33	3.9847	0.6159	0.5379	-83.0454	-2.0555	**0.0398***
34	-16.7334	-2.5865	**0.0097****	-99.7788	-2.4386	**0.0147***
35	-3.0443	-0.4706	0.6379	-102.8232	-2.4822	**0.0131***
36	3.5072	0.5421	0.5877	-99.3159	-2.3688	**0.0178***

37	-7.0026	-1.0824	0.2791	-106.3185	-2.5061	**0.0122***
38	-2.0280	-0.3135	0.7539	-108.3465	-2.5248	**0.0116***
39	1.9141	0.2959	0.7673	-106.4325	-2.4524	**0.0142***
40	0.6893	0.1066	0.9151	-105.7431	-2.4099	**0.0160***
41	3.1519	0.4872	0.6261	-102.5912	-2.3131	**0.0207***
42	10.1327	1.5662	0.1173	-92.4585	-2.0628	**0.0391***
43	12.4273	1.9209	0.0547	-80.0313	-1.7672	0.0772
44	-16.3149	-2.5218	**0.0117***	-96.3462	-2.1061	**0.0352***
45	7.1149	1.0998	0.2714	-89.2313	-1.9314	0.0534
46	5.2120	0.8056	0.4205	-84.0193	-1.8010	0.0717
47	1.8939	0.2927	0.7697	-82.1254	-1.7437	0.0812
48	-4.5872	-0.7090	0.4783	-86.7125	-1.8240	0.0682
49	-8.9143	-1.3779	0.1682	-95.6268	-1.9931	**0.0463***
50	-2.9909	-0.4623	0.6439	-98.6177	-2.0370	**0.0416***
51	-9.5516	-1.4764	0.1398	-108.1693	-2.2146	**0.0268***
52	-2.3765	-0.3673	0.7134	-110.5458	-2.2437	**0.0249***
53	5.6043	0.8663	0.3863	-104.9416	-2.1118	**0.0347***
54	7.7337	1.1954	0.2319	-97.2078	-1.9398	0.0524
55	-4.3984	-0.6799	0.4966	-101.6063	-2.0109	**0.0443***
56	1.7933	0.2772	0.7816	-99.8130	-1.9594	0.0501
57	-4.3143	-0.6669	0.5049	-104.1273	-2.0278	**0.0426***
58	-1.7002	-0.2628	0.7927	-105.8275	-2.0447	**0.0409***
59	-12.0589	-1.8640	0.0623	-117.8863	-2.2602	**0.0238***
60	-6.7381	-1.0415	0.2976	-124.6244	-2.3712	**0.0177***

Note: *Statistically significant at the 5% level.
            ** Statistically significant at the 1% level.

Appendix 2

Large Issues by mode's Stock Price Effects Surrounding the Announcement of Private Placement

This table presents the stock price effects surrounding private placement announcements by biotechnology companies as classified as been large issue by mode (those that issue more than $3 million) over the sample period of January 2004 to December 2004. The event day (Day 0) is defined as the actual date of announcement by the company. TAR is the total abnormal return of the cross-sectionally combined observations for the relevant event day. TSCAR is the total cumulative average abnormal return between day -5 and the relevant event day

Panel A: Daily Average Abnormal Returns

Event Day	TSAR	Z Statistic	p Value	TSCAR	Z Statistic	p Value
-5	1.1593	0.2393	0.8109	1.1593	0.2393	0.8109
-4	-1.3986	-0.2886	0.7729	-0.2393	-0.0349	0.9721
-3	-6.1301	-1.2651	0.2058	-6.3694	-0.7589	0.4479
-2	-2.9567	-0.6102	0.5417	-9.3261	-0.9623	0.3359
-1	-0.7077	-0.1460	0.8839	-10.0338	-0.9261	0.3544
0	-7.2477	-1.4958	0.1347	-17.2815	-1.4560	0.1454
1	-17.4712	-3.6056	**0.0003****	-34.7527	-2.7108	**0.0067****
2	1.7154	0.3540	0.7233	-33.0373	-2.4106	**0.0159***
3	-3.9598	-0.8172	0.4138	-36.9971	-2.5451	**0.0109***
4	4.8967	1.0106	0.3122	-32.1004	-2.0949	**0.0362***
5	-3.7575	-0.7754	0.4381	-35.8579	-2.2312	**0.0257***
6	-2.4743	-0.5106	0.6096	-38.3322	-2.2837	**0.0224***
7	-8.6683	-1.7889	0.0736	-47.0005	-2.6902	**0.0071****
8	-3.0456	-0.6285	0.5297	-50.0461	-2.7604	**0.0058****
9	-7.6269	-1.5740	0.1155	-57.6730	-3.0732	**0.0021****
10	-3.6846	-0.7604	0.4470	-61.3576	-3.1657	**0.0015****
11	-2.5807	-0.5326	0.5943	-63.9383	-3.2003	**0.0014****
12	8.7802	1.8120	0.0700	-55.1581	-2.6831	**0.0073****
13	-5.5267	-1.1406	0.2540	-60.6848	-2.8732	**0.0041****
14	4.0841	0.8429	0.3993	-56.6007	-2.6120	**0.0090****
15	-5.3695	-1.1081	0.2678	-61.9702	-2.7908	**0.0053****
16	3.6030	0.7436	0.4571	-58.3672	-2.5681	**0.0102***
17	-5.0047	-1.0328	0.3017	-63.3718	-2.7270	**0.0064****
18	-7.4514	-1.5378	0.1241	-70.8232	-2.9835	**0.0028****
19	-1.9332	-0.3990	0.6899	-72.7563	-3.0030	**0.0027****
20	-5.9349	-1.2248	0.2206	-78.6912	-3.1849	**0.0014****
21	4.9914	1.0301	0.3030	-73.6998	-2.9271	**0.0034****
22	-9.5164	-1.9640	**0.0495***	-83.2162	-3.2455	**0.0012****
23	-1.2840	-0.2650	0.7910	-84.5002	-3.2383	**0.0012****
24	-3.9802	-0.8214	0.4114	-88.4804	-3.3338	**0.0009****
25	-8.0233	-1.6558	0.0978	-96.5037	-3.5770	**0.0003****
26	4.4004	0.9081	0.3638	-92.1034	-3.3602	**0.0008****
27	-3.7955	-0.7833	0.4334	-95.8989	-3.4452	**0.0006****
28	10.3119	2.1281	**0.0333***	-85.5870	-3.0292	**0.0025****
29	2.8527	0.5887	0.5560	-82.7343	-2.8861	**0.0039****
30	-4.1234	-0.8510	0.3948	-86.8578	-2.9876	**0.0028****
31	3.0135	0.6219	0.5340	-83.8443	-2.8447	**0.0044****
32	-1.6886	-0.3485	0.7275	-85.5329	-2.8635	**0.0042****
33	0.2647	0.0546	0.9564	-85.2682	-2.8178	**0.0048****
34	-5.7386	-1.1843	0.2363	-91.0068	-2.9696	**0.0030****

35	-2.5046	-0.5169	0.6052	-93.5114	-3.0139	**0.0026****
36	2.3407	0.4831	0.6290	-91.1707	-2.9033	**0.0037****
37	-4.6688	-0.9635	0.3353	-95.8395	-3.0163	**0.0026****
38	-3.6542	-0.7541	0.4508	-99.4937	-3.0955	**0.0020****
39	-2.7956	-0.5769	0.5640	-102.2893	-3.1469	**0.0017****
40	-5.3934	-1.1131	0.2657	-107.6826	-3.2766	**0.0011****
41	-0.1252	-0.0258	0.9794	-107.8079	-3.2453	**0.0012****
42	1.4559	0.3005	0.7638	-106.3520	-3.1680	**0.0015****
43	12.5959	2.5995	**0.0093****	-93.7561	-2.7641	**0.0057****
44	-11.6006	-2.3941	**0.0167***	-105.3567	-3.0749	**0.0021****
45	2.6956	0.5563	0.5780	-102.6610	-2.9667	**0.0030****
46	-3.2589	-0.6725	0.5012	-105.9199	-3.0313	**0.0024****
47	-0.0711	-0.0147	0.9883	-105.9910	-3.0046	**0.0027****
48	-1.5400	-0.3178	0.7506	-107.5311	-3.0199	**0.0025****
49	-8.1052	-1.6727	0.0944	-115.6363	-3.2179	**0.0013****
50	0.3998	0.0825	0.9342	-115.2365	-3.1780	**0.0015****
51	-6.8282	-1.4092	0.1588	-122.0647	-3.3367	**0.0008****
52	-4.9881	-1.0294	0.3033	-127.0529	-3.4429	**0.0006****
53	5.8698	1.2114	0.2257	-121.1830	-3.2559	**0.0011****
54	0.3824	0.0789	0.9371	-120.8006	-3.2185	**0.0013****
55	2.6822	0.5535	0.5799	-118.1184	-3.1211	**0.0018****
56	0.5346	0.1103	0.9122	-117.5839	-3.0818	**0.0021****
57	-1.5741	-0.3248	0.7453	-119.1579	-3.0982	**0.0019****
58	-0.5548	-0.1145	0.9088	-119.7127	-3.0882	**0.0020****
59	-11.7486	-2.4246	**0.0153***	-131.4613	-3.3651	**0.0008****
60	-11.8636	-2.4484	**0.0144***	-143.3249	-3.6409	**0.0003****

Note: *Statistically significant at the 5% level.
          ** Statistically significant at the 1% level.

Appendix 3

Small Issues by mode's Stock Price Effects Surrounding the Announcement of Private Placement

This table presents the stock price effects surrounding private placement announcements by biotechnology companies as classified as been small issue by mode (those that issue $3 million or less) over the sample period of January 2004 to December 2004. The event day (Day 0) is defined as the actual date of announcement by the company. TAR is the total abnormal return of the cross-sectionally combined observations for the relevant event day. TSCAR is the total cumulative average abnormal return between day -5 and the relevant event day

Panel A: Daily Average Abnormal Returns

Event Day	TAR	Z Statistic	p Value	TSCAR	Z Statistic	p Value
-5	-0.2405	-0.0561	0.9553	-0.2405	-0.0561	0.9553
-4	1.5572	0.3633	0.7164	1.3167	0.2172	0.8281
-3	-2.6202	-0.6113	0.5410	-1.3036	-0.1756	0.8606
-2	-0.2307	-0.0538	0.9571	-1.5342	-0.1790	0.8580
-1	3.1682	0.7391	0.4598	1.6340	0.1705	0.8646
0	-0.2596	-0.0606	0.9517	1.3744	0.1309	0.8959
1	0.2152	0.0502	0.9600	1.5896	0.1402	0.8885
2	-1.9319	-0.4507	0.6522	-0.3423	-0.0282	0.9775
3	2.7775	0.6480	0.5170	2.4353	0.1894	0.8498
4	2.5983	0.6061	0.5444	5.0336	0.3713	0.7104
5	0.1449	0.0338	0.9730	5.1785	0.3642	0.7157
6	7.2427	1.6896	0.0911	12.4212	0.8365	0.4029
7	-7.9908	-1.8641	0.0623	4.4304	0.2867	0.7744
8	-3.9968	-0.9324	0.3511	0.4336	0.0270	0.9784
9	3.6970	0.8625	0.3884	4.1307	0.2488	0.8035
10	1.8423	0.4298	0.6674	5.9729	0.3483	0.7276
11	-1.9684	-0.4592	0.6461	4.0045	0.2266	0.8208
12	-1.9971	-0.4659	0.6413	2.0074	0.1104	0.9121
13	-2.0111	-0.4692	0.6390	-0.0037	-0.0002	0.9998
14	-1.3900	-0.3243	0.7457	-1.3937	-0.0727	0.9420
15	0.7071	0.1650	0.8690	-0.6866	-0.0350	0.9721
16	-11.7831	-2.7488	**0.0060**	-12.4697	-0.6202	0.5351
17	2.9009	0.6767	0.4986	-9.5688	-0.4655	0.6416
18	4.4040	1.0274	0.3042	-5.1648	-0.2459	0.8057
19	0.1315	0.0307	0.9755	-5.0333	-0.2348	0.8143
20	1.6734	0.3904	0.6963	-3.3599	-0.1537	0.8778
21	-3.6677	-0.8556	0.3922	-7.0276	-0.3155	0.7524
22	6.3710	1.4862	0.1372	-0.6567	-0.0289	0.9769
23	-0.2095	-0.0489	0.9610	-0.8661	-0.0375	0.9701
24	-1.7563	-0.4097	0.6820	-2.6225	-0.1117	0.9111
25	-5.0420	-1.1762	0.2395	-7.6645	-0.3211	0.7481
26	5.4456	1.2704	0.2040	-2.2189	-0.0915	0.9271
27	6.5991	1.5395	0.1237	4.3801	0.1779	0.8588
28	-3.0359	-0.7082	0.4788	1.3442	0.0538	0.9571
29	-3.3184	-0.7741	0.4389	-1.9742	-0.0778	0.9379
30	-0.8972	-0.2093	0.8342	-2.8714	-0.1116	0.9111
31	4.3645	1.0182	0.3086	1.4932	0.0573	0.9543
32	-2.9904	-0.6976	0.4854	-1.4972	-0.0567	0.9548
33	3.7200	0.8678	0.3855	2.2228	0.0830	0.9338

34	-10.9948	-2.5649	**0.0103**	-8.7720	-0.3236	0.7463
35	-0.5397	-0.1259	0.8998	-9.3117	-0.3393	0.7344
36	1.1665	0.2721	0.7855	-8.1452	-0.2932	0.7694
37	-2.3339	-0.5445	0.5861	-10.4791	-0.3728	0.7093
38	1.6262	0.3794	0.7044	-8.8528	-0.3113	0.7555
39	4.7096	1.0987	0.2719	-4.1432	-0.1441	0.8854
40	6.0827	1.4190	0.1559	1.9395	0.0667	0.9468
41	3.2771	0.7645	0.4446	5.2166	0.1775	0.8591
42	8.6768	2.0242	**0.0430**	13.8934	0.4678	0.6399
43	-0.1686	-0.0393	0.9686	13.7248	0.4574	0.6474
44	-4.7144	-1.0998	0.2714	9.0104	0.2973	0.7663
45	4.4193	1.0310	0.3026	13.4298	0.4387	0.6609
46	8.4708	1.9761	**0.0481**	21.9006	0.7085	0.4786
47	1.9651	0.4584	0.6466	23.8657	0.7648	0.4444
48	-3.0471	-0.7109	0.4772	20.8185	0.6609	0.5087
49	-0.8090	-0.1887	0.8503	20.0095	0.6294	0.5291
50	-3.3907	-0.7910	0.4289	16.6188	0.5181	0.6044
51	-2.7233	-0.6353	0.5252	13.8955	0.4294	0.6677
52	2.6116	0.6092	0.5424	16.5070	0.5056	0.6131
53	-0.2656	-0.0620	0.9506	16.2414	0.4933	0.6218
54	7.3514	1.7150	0.0864	23.5928	0.7105	0.4774
55	-7.0806	-1.6518	0.0986	16.5122	0.4932	0.6219
56	1.2587	0.2936	0.7690	17.7709	0.5265	0.5985
57	-2.7403	-0.6393	0.5226	15.0306	0.4418	0.6587
58	-1.1454	-0.2672	0.7893	13.8852	0.4049	0.6856
59	-0.3103	-0.0724	0.9423	13.5749	0.3928	0.6945
60	5.1255	1.1957	0.2318	18.7005	0.5370	0.5913

Note: *Statistically significant at the 5% level.
** Statistically significant at the 1% level.