



## From gold to silicon

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### Abstract

This study examines the market reaction to a recent Australian phenomenon in which mining/resource companies announce an intention to become associated with a private Internet or technology company. We find that the average market adjusted continuous abnormal return to the companies in our sample is approximately 24% over the  $[-4, +1]$  window. With a simple adaptation to the event study methodology, we find the pattern of abnormal returns is consistent with the presence of a speculative bubble. We also find that the type of technology in which the company intends to invest determines the level of abnormal returns. Mining companies that have accessed the equity capital market prior to the announcement experience lower abnormal returns.

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### 1. Introduction

At the height of the Internet stock bubble, *The Economist* reported on the phenomenon of moribund Australian mining companies exploiting back door

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listings to capitalise on investors' enthusiasm with dot.coms.<sup>3</sup> Indeed, the transition of Western Minerals into <http://www.AdultShop.com> has aroused much interest and comment. The fall in the price of gold (and other commodities) in the late 1990s left many mining companies with little of value other than their listing. *The Economist's* article highlighted how dot.coms could be brought to market through the back-door, circumventing the due processes involved in IPOs.

*The Economist*, however, did not comment on the wider phenomenon of Australian mining companies announcing some involvement with a private Internet or technology company (where the technology has no association with mining or resources). Rather than announcing an acquisition, almost all the companies we study announced their intention to make an acquisition of, or their intention to take a share in, an unlisted technology related company. In these cases, the acquisition or investment is always conditional upon a due diligence period or the mining/resource company is given the *option* to acquire the stake in the private technology company.

This gold-to-silicon phenomenon allows us to explore an aspect of investor behaviour during a speculative bubble. Carvalho et al. (2002) make the case that an irrational bubble drove the market for Australian Internet stocks during 1999 and 2000. Large abnormal returns do not, in themselves, provide evidence of irrational exuberance. Our analysis of the cross-section of abnormal returns allows us to make inferences about such matters. The announcements we study are not merger and acquisition (M&A) announcements. At best they are pseudo-M&A announcements. They are announcements of possible intentions to act rather than of plans to act. Morck et al. (1990) have used US evidence to argue that it is perhaps personal, rather than the shareholders', interests that have driven managers to expand through M&A activity. During a boom, we suspect that investors might be gullible and susceptible to managers exploiting their credulousness through pseudo-M&A announcements. Given that merger-waves may be a bubble-like phenomenon, our methodology and findings may inform future research in that area.

The Australian gold-to-silicon phenomenon studied in this paper draws a striking parallel to the Internet name change phenomenon documented by Cooper et al. (2001), who find that firms changing their names to 'dotcom' related names earn abnormal returns of 63% over the  $[-2, +2]$  window. They argue that their results are driven by a degree of investor mania, where investors 'seem to be eager to be associated with the Internet at all costs'. Australian investors appear to have been irrationally exuberant about mining-cum-tech stocks. The most egregious announcement in our sample is the company that announced that its board had 'resolved to investigate and make appropriate investments in the non-mining sector'. The company also said it had no specific plans in this regard, nor had any specific investment opportunities been identified. Nonetheless, its price surged before, during and after this statement. We are reminded of the company established '...for carrying on an undertaking of great advantage, but nobody to know what it is...' during the South Sea Bubble episode (Mackay, 1841).

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<sup>3</sup> '<http://www.oddities.com>', *The Economist*, 28th August 1999, p. 50.

Our findings confirm that the abnormal returns around technology investment announcements are extraordinarily high. Over the  $[-4, +1]$  window, for example, the cumulative abnormal compounded return is 24%. We introduce a simple adaptation to the event study methodology and find that, as would be expected in a speculative bubble, abnormal returns are autocorrelated. Unlike Carvalho et al. (2002), we do not find that the abnormal return is related to the level of the NASDAQ. We also find that investments identified as non-Internet, especially telecommunications related investments, earn an additional premium. Abnormal returns are lower, *ceteris paribus*, in companies that have raised funds via an SEO in the preceding 12 months.

A recent body of literature on the pricing and nature of US Internet stocks has emerged just as the Internet boom subsides. Hand (2001, 2002), Rajgopal et al. (2000), Trueman et al. (2000, 2001) analyse the incorporation of financial and non-financial data (such as site visits) in the pricing of Internet stocks. These studies are able to find consistent patterns in the determinants of prices. That is, they find method in the madness. Demers and Lev (2001) include data from both before and after the Crash of 2000. They show that value drivers before the Crash were still determinants of value after the Crash and that factors they associate with overvaluation were associated with the largest price falls. Like these studies, we also find that, even if responses are excessive, there is method in investors' madness. Huberman and Regev (2001) provide evidence of a fixation with technology stocks in general and find evidence that the Internet boom was as much driven by demand for a broader range of technology stocks, as much as by demand for Internet companies. Schill and Zhou (2001) and Cooper et al. (2001) address the possibility that Internet stocks are overvalued.

The remainder of this paper has the following structure. Section 2 discusses the data and methodology used in this study. Section 3 discusses the findings of the event study and reports the analysis of the determinants of the abnormal returns. Section 4 concludes the paper.

## 2. Data and methodology

Our initial sample of companies is identified from the OzEquities Newsletter, which publishes a quarterly report detailing the Internet/technology investments of resource companies in Australia. The pseudo-M&A announcements were made during a period beginning on the 1st January 1999 and ending 30th May 2000. Thus, the analysis covers events occurring during the height of the Internet stock bubble that has now burst. Consistent with the gold-to-silicon being an epiphenomenon of the bubble, announcements of the type we study have, to the best of our knowledge, ceased.

'Technology' is a very broad umbrella term that could be taken to encompass a wide range of activities. The term is also somewhat arbitrary: for instance, where is the line drawn for an online stockbroker? Is the company a stockbroker or an

Internet company? While previous studies such as Hand (2002) use the ‘51% test’<sup>4</sup> (adapted from <http://www.internet.com>) to distinguish between Internet and non-Internet firms, we are unable to use such a test because the technology companies in our study are private and hence not required to lodge annual reports. Thus, we cannot determine the percentage of revenue attributable to the Internet. Moreover, the technology companies are not predominantly Internet companies. They span a range of industries, from telecommunications to medical technology. As such, we identify several broad classifications of ‘technology’ investments discussed in Section 3.1.2 of this paper. While this may appear subjective, the diversity in the technology acquisitions of mining companies is so large that it precludes us from having a more tightly defined classification scheme.

Our definition of ‘technology’ does not include technological developments related to the mining and resource industry, as these technologies would still have been fundamentally related to the resource company’s original line of business. Therefore, we omit companies that announce the intention to invest in mining technologies (four observations). In addition, we exclude companies with potentially confounding events in the 4-week period surrounding the event date, which might introduce noise during the event window (one observation).<sup>5</sup> The majority of the companies we exclude (48 observations) are simply due to insufficient data being available to conduct an event study. Therefore, from our initial sample of 144 companies, our final sample consists of 88 mining/resource companies that announce the intention to invest in or acquire private technology companies (an announcement we also refer to as a ‘pseudo-M&A’).

To determine the economic impact of a mining company announcing the intention to invest in an Internet/technology company, we use standard event study methodology (Campbell et al., 1997) to examine the ‘abnormal’ stock return at the time of the announcement. The required share price data were obtained from the SIRCA Core Research Data database, for the [–150, +20] days surrounding the event. While we identify our sample from the OzEquities Newsletter, this Newsletter does not provide the exact dates on which the announcements were made. To ensure the accuracy of the event dates, we use both the Signal-G announcement database and the Dow Jones Interactive Archive to identify the earliest announcement date of the investment/acquisition.

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<sup>4</sup> The 51% test requires that 51% or more of a firm’s revenues must come from or because of the Internet. <http://www.internet.com> argues that this separates ‘pure play’ Internet companies from those who may have Internet products but which would and do exist without the Internet.

<sup>5</sup> We identify confounding events as those announcements flagged by the Signal-G database as being ‘Market Sensitive (Y)’. The Signal-G database is a set of company announcements made to, and re-transmitted by, the Australian Stock Exchange.

### 3. Results

The companies making the pseudo-M&A announcements are very small, with a mean market capitalisation of AUD7.18 million, and a maximum of only AUD55 million. On average, each company raised half a million dollars in the 12 months before the announcement through a seasoned equity offering.<sup>6</sup>

Table 1 reports tests of the null hypothesis that cumulative abnormal returns, calculated using market adjusted returns, are equal to zero during a number of event sub-windows:  $[-20, -5]$ ,  $[-4, +1]$ , and  $[+2, +20]$ . The cumulative abnormal returns are large and statistically significant in the first two windows: 20% and 24%, respectively. In the final window, the hypothesis that cumulative abnormal returns equal zero cannot be rejected.<sup>7</sup> It is clear that mining/resource companies announcing their intention to invest in a technology company generate significant abnormal positive returns.

In order to further examine the large abnormal returns accruing to mining companies that invest in Internet/technology companies, we test possible cross sectional determinants of the extent of the abnormal return in the event window. These regressions focus on the  $[-4, +1]$  window and are reported in Table 2 and discussed in Section 3.2.

The nature of our sample of pseudo-M&A announcements leads us to consider that a number of variables commonly used in the M&A literature may play a role in determining the level of abnormal returns for the announcing company. Section 3.1 discusses the variables used in the cross sectional regressions. Unfortunately, the nature of the announcements in our sample, and the features of the companies making the announcements, do not permit the use of variables in precisely the same way as they may be used in the M&A literature. Common indicators such as the PE ratio, for example, are of limited use given that most companies in our sample do not have any earnings.

Table 1  
Significance tests of the market adjusted cumulative abnormal returns over the  $[-20, -5]$ ,  $[-4, +1]$ , and  $[+2, +20]$  windows

Event window	Market adjusted CAR		
	Mean	<i>t</i> -stat	<i>P</i> -value
$[-20, -5]$	0.202	5.247**	0.000
$[-4, +1]$	0.237	6.541**	0.000
$[+2, +20]$	-0.05	(-1.145)	0.26

\*\* Indicates that the statistic is significant at the 1% level. The null hypothesis is that the mean CAR is not significantly different from zero.

<sup>6</sup> Summary statistics and correlation tables may be obtained from the corresponding author on request.

<sup>7</sup> We conducted the tests using unadjusted and market model adjusted continuously compounded returns. We repeated these tests using discrete returns. We also conducted the tests on samples excluding outliers. Our results are robust to the use of these alternative measures.

Table 2  
Determinants of abnormal returns

	Method	Equation		
		(1) OLS	(2) OLS	(3) WLS
Independent variables	CONSTANT	0.246 (3.453)**	0.239 (3.616)**	0.160 (2.036)*
	NONINTER- NET	0.160 (2.389)*		
	TELECOMMS		0.314 (3.577)**	1.111 (24.775)**
	MEDICAL		-0.223 (-1.560)	-0.086 (-0.340)
	OTHER		0.088 (0.826)	0.251 (1.041)
	MKTCAP	0.006 (1.177)	0.004 (0.827)	0.005 (0.524)
	MKTBK	0.003 (0.763)	0.002 (0.448)	0.002 (1.734)
	QUERIES	-0.085 (-2.169)*	-0.058 (-1.458)	0.045 (0.780)
	RUNUP	-0.067 (-0.652)	0.012 (0.122)	-0.102 (-0.890)
	CASH	0.000 (-1.260)	0.000 (-0.881)	0.000 (-1.393)
	SEOAMT	-0.097 (-2.685)**	-0.082 (-2.381)*	-0.192 (-3.813)**
	LAGNASDAQ	0.563 (0.863)	0.4 (0.643)	0.377 (0.378)
	PREVIOUS	0.235 (1.515)	0.240 (1.612)	0.710 (3.374)**
	CRASH	-0.325 (-2.043)*	-0.326 (-2.157)*	-0.489 (-1.637)
Adjusted $R^2$		0.215	0.292	0.984 <sup>a</sup>
Durbin Watson statistic		2.205	2.096	2.167
White's heteroscedasticity test: $P$ -value (No cross terms)		0.172	0.007	0.168

\* and \*\* denote significance at the 5 and 1% levels, respectively. Cross sectional regression of the  $[-4, +1]$  CAR (dependent variable) on the independent variables listed below. OLS and WLS refer to Ordinary Least Squares and Weighted Least Squares estimation techniques, respectively. CONSTANT is the intercept of the regression. NONINTERNET is a binary dummy variable that takes the value of 1 if the mining company invests in a private non-Internet company. TELECOMMS is a binary variable, taking on the value of 1 if the private company is a telecommunications company. MEDICAL is a binary variable, taking on the value of 1 if the private company is a medical/biotechnology company. OTHER is a dummy variable, taking the value of 1 if the technology company does not fit in any of the previous definitions. MKTCAP is the market capitalisation of the firm (AUDm). MKTBK is the company's market-to-book ratio. QUERIES is the number of ASX share price queries in the 12 months before day-5. RUNUP is the continuous market adjusted return over the  $[-20, -6]$  window. CASH is the amount of cash at bank at the date of the last quarterly cash flow report before the announcement. SEOAMT is the amount of equity capital (AUDm) raised in the 12 months prior to day-5. LAGNASDAQ is the cumulated 1 day lag return on the NASDAQ over the same window. PREVIOUS is the continuous market adjusted return over the same window to the last mining company in our sample to announce the intention to invest in the Internet/technology industry, divided by the number of days since that announcement. CRASH is a binary dummy variable that takes the value of 1 if the announcement for the company was made after 30 March 2000.

<sup>a</sup>  $R^2$  based on residuals for the weighted model are not a meaningful statistic because the magnitudes of the residuals have been reduced through division by the weights.

Morck et al. (1990) have focussed on the role of managerial self-interest in M&A activity. Given that the principal synergy between mineral exploration and technology companies seems to be the propensity to squander cash, investors might be expected to look on the pseudo-M&A announcements we study with a degree of

suspicion (although they may applaud managers' ability to create the high level of abnormal returns enjoyed when such announcements are made). Jensen and Meckling (1976), Jensen (1986, 1988) suggest that the announcements might be a function of management acting in their own interest by exploiting free-cash-flow. Recent Australian evidence (Da Silva Rosa et al., 2001a,b) has, however, supported the contrary view of Myers and Majluf (1984). Da Silva Rosa et al. (2001b) is of particular relevance to this study as it focuses on privately held targets. The pseudo-M&A announcements we study, however, seldom make any mention of how the deal is to be financed and, if they do, the financing is often so convoluted that it defies operationalisation. Similarly, it is not possible to gauge the seriousness of the announcements through the analysis of the share of the target that may be acquired or through the timetable for action.

### 3.1. Determinants of abnormal returns

#### 3.1.1. Size and book-to-market

Size (market capitalisation) and the book-to-market ratio have been found to play a role in the cross-section of Australian returns (Fama and French, 1992, 1998; Halliwell et al., 1999). Therefore, we incorporate these variables in our analysis as MKTCAP (the mining company's market capitalisation 1 month before the event date) and MKTBK (the ratio of MKTCAP to the book value of assets less the book value of liabilities at the last annual report date before the event date), respectively.<sup>8</sup>

While we use book-to-market it is doubtful that the figures are strictly comparable between companies. Australian accounting practice does not recognise as an asset the value of the ore still in the ground. Mining companies may show an asset for exploration, evaluation and development expenditure and for stockpiles of ore, but not for the asset it believes it has in the ground, which, we presume, is potentially the most important asset for the companies in our sample.<sup>9</sup>

#### 3.1.2. A premium for internet companies versus other technology companies

We first examine the following issue: do mining companies that make pseudo-M&A announcements about Internet related companies earn higher abnormal returns than mining companies that make such announcements about other technology companies? Anecdotal evidence suggests that technology may have been equated with the Internet. On this basis, we might expect excess returns to mining companies that are linked to Internet companies to be greater than the excess returns to mining companies announcing their intention to make non-Internet technology investments. To test this hypothesis, we search the event date

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<sup>8</sup> Given that the targets are privately held, we cannot use the ratio of the size of both companies in our regressions. Therefore, we are unable to capture the impact of relative size on abnormal return.

<sup>9</sup> The misleading nature of the companies' book-to-market ratios, as well as the unavailability of the targets' book-to-market figures, would also make a ratio of announcer-to-target book-to-market a misleading proxy for the effect of relative size.

announcements on the Signal-G database and develop a classification scheme whereby we classify the potential technology investment as either (i) an Internet/Internet-related or (ii) a non-Internet company. Many of the announcements made provided very poor descriptions of the technology company in question. Indeed, often the announcements appear to be largely an attempt to spark investor interest in the company by mentioning buzzwords related to the Internet. We define the binary dummy variable NONINTERNET that takes a value of 1 if the mining company announces its intention to be involved with a technology company that falls into a category that is not an Internet company, and 0 otherwise (this is the variable that will appear in Equation 1 in Table 2). When we extend this analysis (Equations 2 and 3 in Table 2), three dummy variables are introduced: TELECOMMS, which takes on the value of 1 if the mining company invests in a telecommunications company, MEDICAL, which takes on the value of 1 if the mining company invests in a biotech or medical technology related company, and OTHER, which takes on the value of 1 if the mining company does not invest in an Internet, telecommunications, or medical technology related company.

### 3.1.3. Information asymmetries

Abnormal returns might be a function either of investor speculation or information leakage prior to the mining company announcing its intention to invest in the Internet company. The abnormal returns experienced by a company would be inversely related to both the amount of speculation and the extent of information leakage in the lead-up to the actual announcement. In order to test this hypothesis, we use, firstly, the number of ASX share price queries<sup>10</sup> (QUERIES) that the company was subject to in the 3 months before day  $[-20]$ <sup>11</sup> as a proxy for either information leakage or investor speculation. RUNUP, the abnormal return over the  $[-20, -6]$  window, is used as a second gauge of information leakage.

### 3.1.4. Mining companies as a source of venture capital

An alternative explanation for this unusual phenomenon is that the mining companies were being used as alternative venture capital sources for the plethora of technology startups that were flooding the market. The Australian venture capital market is rather undeveloped. ‘Angel’ companies are virtually non-existent in Australia.

It is generally accepted by the popular press that several technology companies in both the US and Australia have failed due to their excessive cash burn rates. Demers and Lev (2001) provide evidence in support of this belief. The cash reserves of the mining company could thus be a priced factor in the explanation of cross sectional returns, if investors foresaw at the time that a cash rich mining company would be able to fund the cash intensive operations of the technology company. To factor this

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<sup>10</sup> We obtain this information from the ASX Signal-G announcements. The ASX makes share price queries when it notices a sudden/abnormal change in the company’s share price.

<sup>11</sup> Relative to the event date.

possible explanation into our analysis, we define a CASH variable as the cash at bank possessed by the mining company as reported in its latest quarterly cash flow statement.

Alternatively, we posit that mining companies could also provide a source of equity financing. As many of these mining companies are extremely small, most do not have constant revenue streams and are mostly not cashflow positive (surprisingly like Internet companies). As such, mining companies typically access equity capital markets on a rather frequent basis. In light of this, we conjecture that mining companies that have been both willing and able to raise equity capital in the past will be perceived as better sources of funding for the technology company.<sup>12</sup> We define the variable SEOAMT as the amount of SEO capital raised by the mining company in the 12 months prior to it announcing the intention to invest in the Internet/technology company.

If the coefficients for CASH and SEOAMT prove to be positive and significantly different from zero, it could be argued that this finding would be supportive of the mining stocks overcoming capital market imperfections as hypothesised in Myers and Majluf (1984). A negative relationship would be consistent with the announcements being viewed negatively from an agency perspective (Jensen and Meckling, 1976; Jensen, 1986, 1988). CASH may also reflect the theoretical concept of free-cash-flow. The nature of the companies we study, particularly the misleading nature of the reported assets of the firms (discussed above), does not facilitate the calculation of a more meaningful measure of free-cash-flow.

### 3.1.5. *A response to activity on Wall Street*

Again, several media reports at the time likened the mining-turned-dotcom phenomenon to the Internet and technology boom in the United States. In addition to popular perceptions, there is some evidence that US returns are related to Australian returns. Durand et al. (2001) find that the overnight return of the US market is significantly and positively related to Australian equity market returns. Carvalho et al. (2002) find that overnight returns of US Internet stocks have a significant and positive relationship to Australian Internet stock returns. Therefore, we examine if abnormal returns are driven by US-influenced exuberance that is proxied by LAGNASDAQ, the return on the 1-day lagged values of the NASDAQ over a window comparable to the CAR we are examining.

### 3.1.6. *Investor psychology*

If the gold-to-silicon phenomenon were part of the Internet stock price bubble, we might expect to see investors base their expectations (and hence returns) of the success of a mining company turned technology company on the returns to the last mining company that announced a similar intention. For instance, if mining

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<sup>12</sup> This conjecture, however, runs contrary to the large body of research into SEOs, which documents consistent underperformance following an SEO. Goh and How (2000) document the long run underperformance of Australian SEOs.

Company A announced the intention to invest in the Internet/technology sector in day 1, then the returns experienced by mining Company B when it announces its intention to follow suit on day 11 (for example) would be conditioned on the returns that Company A experienced.

This process is consistent with the positive feedback trading behaviour discussed in De Long et al. (1990). Similarly, we would expect this effect to be magnified the closer the announcements are in discrete time. Chowdhury and Lin (1993) document autocorrelation in the US market in the boom of the 1980s. Cooper et al. (2001) provide support for this argument, documenting an average abnormal return of 118% in months with the greater number of Internet name changes, relative to the 31% documented for months with fewer Internet name changes (the difference is significant at the 5% level).

In order to test the hypothesis that there is a bubble in abnormal returns, we construct the variable PREVIOUS to capture this effect. We construct this variable by first sorting our database of companies in ascending chronological order. The variable PREVIOUS is then calculated as the  $[-5, +1]$  CAR to the previous mining company (in chronological order) to announce its intention to invest in an Internet/technology company, divided by the number of days since this previous announcement to capture the decay in the effect of lagged announcements through time.

$$\text{PREVIOUS}_i = \frac{\text{CAR}_{i-1,[-5,+1]}}{n} \quad (1)$$

where  $\text{PREVIOUS}_i$  is the value of the variable PREVIOUS for company  $i$  (sorted in chronological order by announcement date);  $\text{CAR}_{i-1,[-5,+1]}$ , the value of the  $[-5, +1]$  continuous market adjusted CAR to firm  $i-1$ ; and  $n$  is the number of days between company  $i$ 's announcement date, and company  $i-1$ 's announcement date

If there are several announcements on a particular date, we treat all the observations on that day similarly, and use the previous announcement that was made on a previous day. For instance, if there was one announcement made on day 1, and five announcements made on day 2, then the PREVIOUS value for all the companies on day 2 is just the  $[-5, +1]$  CAR for the company that made the announcement on day 1. For a company that made the announcement on day 3 then, PREVIOUS is the average value of the  $[-5, +1]$  CARs for all the firms that made the announcement on day 2.

### 3.1.7. The tech-crash: April 2000

The final factor that we expect to have a significant impact on the level of abnormal returns experienced is whether the event date occurs before or after the US Internet stock market crash in April 2000. While most of the studies into the Internet stock phenomenon were conducted with data prior to 2000, Demers and Lev (2001) span the crash period and show that investors become more 'rational' in their valuations of Internet companies after the crash: the cash-burn rate of an Internet company becomes an important explanatory variable in the pricing of Internet

stocks after the crash. [Carvalho et al. \(2002\)](#) find that the Crash also affected Internet stock price behaviour in Australia.

Nevertheless, implicit in studies that test for bubbles/fads (such as [Chowdhury and Lin, 1993](#)) is the notion that we should expect some time variance in returns before and after a crash. Indeed, it would seem only logical to expect that returns be lower when a fad or bubble has burst. We define the dummy variable CRASH as taking on the value of 1 if the event occurs on or after 1 April 2000, and 0 otherwise. There are five observations in our sample that occur after this date.

### 3.2. Results of cross-sectional analysis

The results of our cross sectional analyses are reported in [Table 2](#). In addition to the intercept, only four variables are significant in Equation 1: QUERIES, SEOAMT, CRASH and NONINTERNET.

We hypothesised that QUERIES, the number of ASX share price queries, may proxy for investor speculation or information leakage prior to the event and that abnormal returns would have a negative relationship with this variable. This variable is significant at the 5% level and negative (the coefficient equals  $-0.085$ ) as hypothesised. This may be contrasted with the variable RUNUP, which may also proxy for this effect: we cannot reject the hypothesis that RUNUP is significantly different from zero.

In Equation 1, we also find that SEOAMT, representing the value of seasoned offerings in the previous year, is negative (the coefficient equals  $-0.097$ ) and significant at the 1% level. The more funds raised through this method, the lower the abnormal return. This, along with the insignificance of CASH, is contrary to our expectations (and also to [Da Silva Rosa et al., 2001a,b](#)) that well funded firms may be a better incubator for the technology company. In keeping with [Jensen and Meckling \(1976\)](#), [Jensen \(1986, 1988\)](#), this is consistent with investors perceiving that firms that have raised funds through this source are more likely to engage in value reducing investments *ceteris paribus*.

The NASDAQ crash, represented by the variable CRASH, is significant at the 5% level and has a negative effect on abnormal returns (the coefficient equals  $-0.325$ ). This is consistent with [Demers and Lev \(2001\)](#) who show how investors' behaviour was conditioned by this experience. On the other hand, we find no evidence that the level of NASDAQ (LAGNASDAQ) or previous abnormal returns (PREVIOUS) condition abnormal returns.

The NONINTERNET dummy is consistently positive and significant. Contrary to our expectations, it appears that mining companies that invest in non-Internet related companies experience significantly higher abnormal returns than those mining companies that invest in Internet related companies. The size and book-to-market variables are also found to be insignificant in Equation 1.

The result for NONINTERNET is surprising. Indeed, it runs contrary to the oft-perceived 'attractiveness' of Internet related companies at the time. Equations 2 and 3 in [Table 2](#) explore this finding in more detail by replacing NONINTERNET with TELECOMMS, MEDICAL and OTHER (dichotomous variables capturing the

range of non-internet investments we could identify). We encountered heteroscedasticity in Equation 2. Equation 3 corrects the heteroscedasticity by using Weighted Least Squares estimation using MKTBK as the weight. The following discussion refers to Equation 3.

The TELECOMMS variable is positive (the coefficient equals 1.111) and significant at the 1% level. It appears announcements fitting within this classification drive the findings for NONINTERNET in Equation 1. At the time of the Internet bubble, large numbers of Australian investors had participated in the very successful float of Telstra, the former Government-owned telecommunications monopoly. Our conjecture is that investors framed their expectations of these investments with Telstra in mind (see [Hirshleifer, 2001](#), especially pages 1541–1543). The SEOAMT variable is again negative and significant. In contrast to Equation 1, we find no evidence that the NASDAQ crash influences abnormal returns: companies that make the announcement after the Crash do not appear to experience lower abnormal returns than those that make the announcement before the date.

PREVIOUS is positive (the coefficient equals 0.710) and significant at the 1% level in Equation 3 (in contrast to Equation 1, where it is insignificant). This is consistent with a degree of dependence/correlation in the returns experienced by the firms in our sample. In this analysis, the abnormal return experienced by a mining company making a pseudo-M&A announcement is positively related to the return to the previous mining company (in chronological order) to make a similar announcement. The closer the announcements, the larger the positive correlation. This is what should occur if the market is being driven by a speculative bubble ([Chowdhury and Lin, 1993](#)). The positive significance of PREVIOUS is also consistent with a degree of positive feedback trading, akin to that described by [De Long et al. \(1990\)](#). This finding is also in line with [Cooper et al. \(2001\)](#), who find a ‘hot’ market effect where the returns to firms that change their names to Internet related ones in months with greater name change activity earn higher abnormal returns than those that make the name change in months with fewer name changes.

#### **4. Conclusion**

The technology boom of the late 20th century has been an international phenomenon. This study has focussed on an Australian perspective of that experience: the phenomenon of mining companies announcing an intention to invest in private ‘high-tech’ companies. Medieval alchemists struggled in vain to turn base metals into gold. Australian entrepreneurs have turned gold to silicon.

This paper documents positive and significant abnormal returns accruing to the mining companies in question. These abnormal returns occur predominantly in the lead up to the announcement. We document, for instance, a 24.2% market adjusted average continuous abnormal return over the  $[-4, +1]$  window. Post event, however, returns are insignificantly different from zero.

An analysis of the cross sectional determinants of abnormal returns also produces some findings that run contrary to the grain of popular wisdom. It appears that the

mining companies in our sample that make pseudo-M&A announcements relating to private telecommunications companies earn higher abnormal returns than those that make such announcements about Internet related or other technology companies. We suggest that this is due to investors framing their decisions with the success of Telstra's privatisation in mind.

We document an inverse relationship between the amount of SEO equity capital raised by the mining company in the 12 months prior to the event, and the abnormal returns experienced. This finding is consistent with the body of SEO literature and investor concerns about the agency costs of free-cash-flow, but inconsistent with our hypothesis that mining companies that have had historical success at accessing the capital markets may be a good source of venture capital.

We also provide weak evidence for the conjecture that abnormal returns to mining companies after April 2000 are lower than those that made the announcement before April 2000.

Finally, we provide evidence that there was a degree of interrelation between the abnormal returns. We find that abnormal returns are positively related to the size of the abnormal return of the previous event date (chronologically) in our sample, and inversely related to the length of time between the successive announcement dates. This finding is consistent with a sense of investor irrationality that might be expected in a speculative bubble. As far as we are aware, this is the first event study to document such time series properties between abnormal returns. We believe that the inclusion of a variable such as PREVIOUS in other studies may uncover further evidence of event bubbles such as that documented in this paper.

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