Long-run survival and performance of Australian dot.com IPOs

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Abstract

This paper explores the long-run survival and sharemarket performance of companies which made an Initial Public Offer (IPO) around the time of the sharemarket correction in 2000. Unlike other studies we do not find evidence to support the proposition that dot.coms failed more frequently than non-dot.com stocks. Results were not sensitive to listing pre or post correction. Further, we do not find the average market adjusted returns of non-dot.com stocks significantly outperformed those of dot.com stocks. These findings overturn conventional thinking with regards to the dot.com bubble and warrant further investigation.

Keywords: Initial Public Offerings, Hot Issues Markets, Internet, dot.com

JEL Classification: G32
Long-run survival and performance of Australian dot.com IPOs

1. Introduction

The late 1990s was marked by the founding of numerous internet based companies commonly referred to as dot.coms. Vast sums of money were invested in establishing these companies. A combination of low interest rates, widely available venture capital and increasing stock prices stimulated investment in these businesses. Some companies made an Initial Public Offer (IPO) and raised substantial amounts of capital even though they had not traded or generated any revenue. Many dot.coms made IPOs and began trading at prices significantly above their subscription prices. By the beginning of 2000 however, many investors and commentators believed that stock prices, particularly those of dot.com stocks, were inflated and that a market correction was imminent (Steen and Turpie 2000). In mid-April of that year the market correction (popularly known as the ‘Tech Wreck’) occurred. While the price of virtually all dot.com IPOs crashed at the time of the correction several companies, such as Google, have recovered to become giants. The devastation of the ‘tech wreck’ raises questions about the long-run IPO performance and survival of dot.coms.

The commonly held perception is that most of the dot.coms were a poor investment with few companies becoming a successful long-term investment. That many dot.coms failed is beyond dispute. In the first issue of 2000, Fortune published a memorial to ‘the 135 US dot.com firms that went bankrupt or shut down in 2000’ (Mahajan, Srinivasan and Wind, 2002 p.474). Several possible reasons have been advanced for these failures including investor over-enthusiasm, lack of viable business models, questionable profit forecasts, lack of adequate assessment valuation models as well as lack of management expertise.

Given the poor performance of investments in dot.com companies noted in other countries such as the US this paper considers the long-run survival and returns performance of Australian dot.com IPOs. Significant differences in listing rules, issue procedures and issue size exist between the US and Australian markets which justify a study of Australian dot.com issuers. We examine the long-run investment performance of IPOs made around the time of the now infamous ‘tech wreck’. While several studies have looked at short-run IPO performance we consider whether investors would have been better or worse off in the long-run to invest in Australian dot.com IPOs as opposed to non-dot.com IPOs.

This paper is divided into several sections. Section 2 provides a review of the literature on hot issues markets, long-run returns and dot-com IPOs. Section 3 develops research questions and outlines the methodology employed in the study. Section 4 provides a discussion of results, and section 5 provides conclusions, limitations of the current research, and implications for future study.

2. Literature review

2.1 Hot issues markets and long-run returns

Ibbotson and Jaffe (1975) noted evidence of ‘fads’ in the US market for IPOs. They called these events ‘hot issue markets’ and noted that such markets are characterised by:

- Numerous offerings;
- Concentration of new issues in particular industries;
• Preponderance of smaller issues;
• Frequent oversubscription; and
• Abnormally high initial returns.

Ritter (1984) investigated the level of underpricing of IPOs in the US ‘hot issue’ market of January 1980 to March 1981. He reported an average initial return on unseasoned new issues of common stock of 48.40 per cent which was significantly higher than that found in ‘non-hot’ or ‘cold’ markets. This level of underpricing was almost entirely confined to IPOs of resource stocks. Subsequently, Allen and Faulhaber (1989) suggest that the underlying reason for Ritter’s findings was the general economic conditions that existed at the time, in particular the 1979 oil crisis. They argue that such fluctuations in economic conditions give rise to changing conditions of the IPO market. Allen and Faulhaber’s conclusions have been supported by others; including Rajan and Servaes (2003). Numerous studies have subsequently confirmed the presence of ‘hot’ and ‘cold’ markets across time and location including the US (see for example Wise, 1988; Marcial, 1992; Dark and Carter, 1993; Helwege and Liang, 2004) UK, Germany and South Korea (Ritter 1998). Studies have confirmed that hot IPO market conditions existing in early 2000 were driven by the presence of a stock market bubble (Ljungqvist, Nanda and Singh, 2006).


While large short-term returns can result for initial subscribers in the IPO research suggests that over the long-run IPOs on average earn lower returns than comparable existing or seasoned firms. Long-run underperformance has puzzled researchers in financial economics ever since and is identified by Ritter and Welch (2002) as possibly the most controversial area of IPO research. Ritter (1991) found that when considered over the period from issue to their third anniversary of listing, U.S. IPOs on average substantially under-performed a matched sample of seasoned firms, with significant variation in performance depending on the year and industry under consideration. Companies that went public in high volume or ‘hot’ years performed the worst. This finding was attributed to over-confidence on the part of issuers and investors during these periods.

Consistent with many earlier studies Cook et al. (2003) examined 6,080 US IPOs that listed between 1980 and 2002, and found that IPOs during ‘hot’ markets tend to perform more poorly than IPOs during ‘cold’ markets. They find that IPOs trade at higher valuations and their offer sizes are larger during ‘hot’ markets and that these firms are less likely to survive in comparison to firms making IPOs in ‘cold’ markets. Similarly in a study of French IPOs Derrien (2005) found that IPOs occurring during bullish market conditions were overpriced compared to those that listed in bearish conditions.

Helwege and Liang (2004) consider the long-run performance over the five years post listing of 3,698 US IPOs over the period 1975 – 2000. They found no significant difference in post-issue operating performance between IPOs listed in ‘hot’ and those listed in ‘cold’ or
‘neutral’ markets. Further they found that more issue went public in ‘hot’ markets than in other markets and that ‘hot’ markets were not driven primarily by changes in adverse selection costs, managerial opportunism, or technological innovations, but more likely reflect greater investor optimism.

Following Helewege and Liang (2004), Ljungqvist, Nanda and Singh (2006) propose a theoretical model in which the presence of irrational (overly exuberant) investors leads to ‘hot’ markets and the associated long-run underperformance. Their model indicates that sentiment investors driven by market fads purchase stock from institutional investors at inflated prices. The implications of Ljungqvist, Nanda and Singh’s model have been supported empirically for example by Ivanov and Lewis (2008). Ivanov and Lewis considered whether IPO volume was related to business conditions, investor sentiment, and time variation in adverse selection costs caused by asymmetric information between managers and investors. They found that time variation in business conditions and investor sentiment were important determinants of monthly issue activity. On the other hand they indicate time variation in adverse selection costs did not significantly affect IPO volume.

The majority of studies mentioned above are of US IPOs. In addition there are Australia studies which have found poor long-run average returns. Mustow (1994) and Allen and Patrick (1994) document under-performance in post-listing returns of IPOs over a 3-year period of –25.38% and –112.8% respectively. The difference in the returns performance between these two studies may be due to different sample periods being analysed (1984 to 1988 versus 1974 to 1984). The earlier study may have covered a ‘hot issue’ market while the later did not.

An implication of the existence of ‘hot’ periods of high IPO volume, high initial returns (underpricing) and subsequent underperformance is that market timing is upmost in issuers’ considerations when bringing an IPO to market.

2.2 Research on dot-com IPOs

Several studies have focused on various aspects of dot.com IPOs. Studies consistently report high initial returns for IPOs made in the period prior to the stock market correction and subsequent negative returns performance. In a study of 48 US online retailers that went IPO in the period 1997 to 2000 Mahajan, et al. (2002) found that by the end of 2000 only one IPO had an increase in stock price since the IPO. Likewise, Coakley, Hadass and Wood (2006) found significant underperformance in high-technology IPOs which went public in the ‘hot’ UK market at the time.

Bhattacharya, Galpin, Ray and Yu (2009) attempted to explain the pattern of returns of dot.com stocks. They undertook a content analysis of news media on US stocks listing between 1996 and 2000 to test the assertion by Shiller (2000) that media hyped dot.com stocks and that this media was a major factor behind the dramatic rise and fall in their share values. Bhattacharya et al. (2009) found that while media were more positive for dot.com pre-correction and more negative in the period post-correction, media hype alone was unable to account for the difference in returns.

Chen and Guo (2010) recently attempt to explain the pattern of IPO returns in emerging industries such as biotechnology and the Internet. They proposed that this pattern of returns
was largely due to the fact that investors do not have full knowledge of the industry and learn from other IPOs in the industry as they emerge.

In a slightly different vein to the above studies Jain, Jayaraman and Kini (2008) suggest that the proportion of companies going public before becoming profitable has increased over time and that this has been driven principally by high technology firms. Results of their modeling find that the probability of post-IPO profitability increases with pre-IPO investor demand and the change in ownership of the IPO by the top offices and directors. The probability of post-IPO profitability decreases with venture capitalist participation, the proportion of outsiders on the board and pre-market valuation uncertainty. Their work builds on earlier work of Ljungqvist and Wilhelm (2003) who found pricing behavior of dot.com stocks was at least partially accounted for by changes in ownership structure and insider selling behavior over the period which reduced decision makers incentives to control underpricing.

Evidence of Australian dot.com IPO performance is rather limited. Steen and Turpie (2000) examined the initial post-listing stock price returns for dot.com IPOs relative to all IPOs in Australia during 1999. Results indicated that by the close of the first day of trading, subscribers to the IPOs of dot.com companies would have earned an average market-adjusted return of 60.84 per cent, compared with 35.52 per cent for an investment in non-dot.com IPOs. The authors suggested that a possible explanation for the significant difference in returns was due to the presence of a ‘hot’ market or bubble.

Post-correction 2004 Steen and Turpie (2004) re-examined the performance of Australian dot-com IPOs. Specifically, they considered the level of initial post-listing stock price returns of all IPOs listed on the Australian Stock Exchange (ASX) over the period January 1999 to August 2001. They found post-correction IPO initial returns were substantially lower than pre-correction IPO initial returns on average. Mean returns for dot.com stocks were higher than non-dot.com stocks pre-correction but this situation was reversed in the post-correction period. They also found that the market correction was significant in determining initial returns. Cumulative Adjusted Returns (CARs) for the first five month post-listing fell dramatically and the difference between dot.com and non-dot.com stocks CARs was statistically significant.

While there are a number of studies into the stock market performance of dot.com IPOs there is a paucity of studies considering the long-term survival and stock market performance of Australian dot.com IPOs. Australia has one of the world’s most developed equity markets and had a large number of dot.com IPOs list during the late 1990s and early 2000s. This paper aims to address this gap in the literature. In doing so we note the suggestion by Mahajan et al. (2002 p.485) that future researchers should consider the performance of dot.com IPOs over time: “future research … of IPO-ed firms could model the survival duration of dot-com startup firms”.

From the above discussion it can be observed that pre-crash dot.com IPOs have on average significantly higher initial returns than non-dot.com stocks. Prior studies such as Ritter (1991) indicate ‘hot’ markets are characterized by a high proportion of poor quality IPOs in the ‘hot’ industry pre-crash. Over time this should translate into higher failure rates for the dot.coms compared to the non-dot.coms going IPO in the pre-crash period. In the wake of the market crash we should observe that the poor quality dot.com average returns adjust downward underperforming other stocks over the long-term.
Hence, we can hypothesise:

\( H_1 \)  dot.com stock long-run returns on average should be significantly lower than non-dot.com stocks; and

\( H_2 \)  dot.coms that made an IPO in the pre-crash period should have a significantly higher failure rate than non-dot.coms that made an IPO in the pre-crash period.

3. Data and Methodology

3.1 Data

The sample consisted of all new listings on the ASX between the 1st of January 1999 and 31st of August 2001 as listed on the Connect4 database. Each IPO was examined to determine whether they were a true IPO in the sense that they were the first equity issue to the market at large. Hence, investment and property trusts, re-listings, spin-offs, compliance listings, companies currently listed on a foreign exchange and issues of convertible securities were excluded from our sample. The period was chosen to obtain an even split of 16 months either side of the 14 April 2000 market correction. Share prices were obtained from the SIRCA database. Company specific data were obtained from company prospectuses and the Connect4 database.

Of the 299 IPO’s listed during the period, 98 were classified as dot-com or dot-com related companies, determined from the description of the company’s business activities in the prospectus and confirmed in the company details section of the Aspect DatAnalysis database.

3.2 Performance Measures

Following accepted methodology, the initial return was defined as the first day gross return to an investor who acquired a share by subscribing to the IPO and who later sold it at the closing price on the first day of trading.

The abnormal return for each IPO, \( i \), over the period \( t-1 \) to \( t \) is defined as \( AR_{it} \) where:

\[
AR_{it} = \frac{P_{it} - P_{i,t-1}}{P_{i,t-1}} - \frac{I_t - I_{t-1}}{I_{t-1}}
\]

and;

\( P_{it} \)  the closing price of share \( i \), \( t \) periods after the initial offering

where \( t = \)  day 1 to day 21 and months 2 to 120, and \( t_0 \) is the offer date,

\( I_t \)  the value of the All Ordinaries Accumulation index \( t \) days or months after the offering,

\( t \)  \( 1, \ldots, T \)

The Average daily market Adjusted Return, \( AAR_t \), (calculated to accumulate the abnormal returns for a portfolio of \( N \) companies at time \( t \)) is given as:
The sample mean $AAR_i$ is a performance index reflecting the return (in excess of the market return) on an investment, divided equally among the $N$ issues in the sample.

The Cumulative market Adjusted Return (CAR) for the sample for months 2 to 120 is:

\[
CAR_t = \sum_{t=1}^{T} AAR_t
\]

3.3 Identification of hot and cold IPO markets

Hot and cold IPO markets have been variously defined in the literature. The most commonly used criteria for identifying ‘hot’ issues markets are periods of high IPO volume or high level of initial returns (for example Ibbotson and Jaffe, 1975; Ritter, 1984, Loughran and Ritter, 1995; Helwege and Liang, 2004 and Derrien, 2005). These two criteria are related as Lowry and Schwert (2002) show. They investigate the relationship between volume and underpricing or high initial returns over ‘hot’ and ‘cold’ markets and find that periods of high underpricing are typically followed by high IPO volume. In addition to these two indicators of IPO market activity Coakley, Hadass and Wood (2006) use a non-negative autocorrelation in the number of yearly IPOs to capture the momentum generated by investor sentiment in ‘hot’ markets. This additional criteria requires that the number of IPOs in a ‘hot’ market year to be no lower than that in the previous calendar year. As we are dealing in this study only an 18 month period either side of a clearly defined market correction we define the hot market as the period of high level of initial return prior to the stock market correction.

4. Results

On Friday April 14 2000 US stock markets experienced a major correction. While the markets had been experiencing a degree of higher than usual volatility the preceding weeks this date marked the most significant correction for several years. The Australian market followed suit, falling 5.68 percent when the market closed on the following Monday. This correction has become known as the ‘Tech Wreck’. Table 1 shows descriptive statistics of dot.com and non-dot.com IPOs pre and post April 14 2000. The table indicates that, on average, pre-crash and post-crash dot.com IPOs raised less funds than non-dot.com IPOs however the difference in the amount raised was not statistically significant. In terms of Total Assets dot.coms were on average larger than non-dot.coms pre-crash but the difference was statistically insignificant. Post-crash non-dot.com IPOs were significantly larger but this maybe somewhat distorted a particularly large IPO. In the wake of the ‘Tech Wreck’ the number of IPOs listing did not fall although fewer dot-com’s listed post correction (43 as opposed to 55 pre-correction). In the 16 months post-correction, 136 IPOs listed while 163 listed post-correction.
Table 2 provides details of initial return for all IPOs, pre and post-correction. What is evident is that initial returns for all IPOs were dramatically lower post-correction (10.46%) than pre-correction (58.69%), statistically significant at the one percent level. This supports the notion of a ‘hot’ issue IPO market, particularly with respect to dot.com stocks. Mean returns pre-correction for dot.com stocks (80.21%) were far greater than non-dot.com stocks (44.08%). These results were reversed post correction with dot.com stocks returns (5.60%) substantially lower than non-dot.com stocks (12.21%). Not surprisingly, given the large distribution of returns there was no statistical difference in initial returns between dot.com and non-dot.com stocks. An analysis of variance with initial return as the dependent variable and binomial independent variables representing market correction and dot.com or non-dot.com stocks indicates that the market correction was highly significant (at the 1% level) in determining initial returns. However, the binomial variable representing dot.com or non-dot.com stocks was not significant in explaining differences in initial returns. This could be due to the few cases of extremely high initial returns. Hence we normalised the sample by excluding cases where the initial return was more than three standard deviations from the mean. When the analysis of variance was recalculated both the market correction and dot.com/non-dot.com variables were significant in explaining differences in initial returns (Adjusted $R^2$ 10.70%, F= 18.432 P<.0005).

Chart 1 shows the performance of the market index over the sample period and IPO initial returns. While the market index recovered quickly following the April 14 2000 correction, IPO initial returns on average appear visibly lower, signifying an end to the ‘hot’ issue market.

We analyse the long-run performance of dot.com IPOs over a ten-year time horizon. While this is a long period for most capital market studies it is relevant in the Australian context given the long-term nature of equity market investment particularly in the form of pension fund (superannuation savings). Chart 2 shows the long-run CARs of dot.com, non-dot.com and all IPOs listed for the two to 120 months period post-listing. CARs of dot-com IPOs fall dramatically after month four and by the end of the year had lower returns than non-dot.com IPOs. This clearly illustrates that dot.com stocks were, in general, initially overpriced compared with non-dot.com stocks, and when the market re-evaluated their future, prices fell accordingly. Statistically, the difference between the CARs of dot.com and non-dot.com IPOs was significant for the first five months of trading. Unlike those of the dot.com stocks, CARs of non-dot.com IPOs were in excess of 20 percent for the full 12 months.

At month 120 CARs of non-dot.com IPOs were approximately 60 percent while those of dot.coms were just over 50 percent. While on average returns for the dot.coms were lower for the dot.com stocks the difference between CARs of the two groups was statistically insignificant. We can therefore reject hypothesis 1 which posited that over the long-term dot.com IPOs would underperform non-dot.com IPOs.

To investigate the survival of dot.com versus non-dot.com IPOs over time we employ a Hazard model. These models were estimated to examine the role of initial listing characteristics on each company’s survival. Hazard models estimate the effect of variables on an event, in this case delisting, at a given time. Time, in months, from IPO to delisting for

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1 In this paper delisting indicates company failure. While not all companies that delist ‘fail’ in the sense of complete financial collapse the vast majority do. Approximately 40% of delisted companies entered voluntary administration, went into
companies listing within 16 months either side of the “tech wreck” in April 2000 was used as the variable of interest. Independent variables used are; logSIZE which is the log of a company’s nominal size at listing, in millions, PRECRASH which is a dummy variable coded 1 if the company listed before the crash or zero if listed afterward, MISPRICE which is the listing day return, and DOTCOM which is a dummy variable coded 1 for tech companies and zero for all others. Data is right censored at December 31st 2010.

Although results are not strong, we find that size is statistically significant in all models. Curiously it was the larger firms that were more likely to delist in any given month, when we might normally expect smaller companies to be more at risk of failure or takeover. The non-dot.com model also indicates that the more underpriced companies at listing were more likely to experience delisting.

Chart 3 shows an estimated survival function for a cox regression. The middle lines in the chart show estimated survival rates while the upper and lower lines are 95 percent confidence intervals. This provides to graphical representation of the hazard models. From the chart it can be seen that dot.com IPO company survival rates were no different to non-dot.com IPO companies’ rates. Given this finding we can reject hypothesis 2 which posits that dot.coms that listed in the pre-crash period should be more prone to failure than non-dot.coms which made an IPO in the pre-crash period.

5. Concluding Comments and Limitations

The above figures show that the correction had a significant impact on the IPO market overall. On average, issues were generally smaller and initial returns lower post correction. These results are consistent with the existence of the transition from a ‘hot’ to ‘cold’ IPO market. What is interesting is that the market (as measured by the All Ordinaries Accumulation Index) recovered quickly after the correction; while average IPO returns did not. A possible reason for this result is that buoyant economic conditions and low interest rates of the time kept the equity market afloat while investor’s appetite for new stocks diminished.

Over the longer-run, investors in non-dot.com stocks maintained a return in excess of 20 percent for the entire period. On average returns on dot.com stocks initially declined dramatically but investors still would have seen a gain of 20 percent on their initial investment during most of the first 12 months. Those that stayed clear of investing in dot.com IPOs would have fared much better after the initial year of listing. This, of course, is predicated on the presumption that they were lucky enough to get an allocation of the float in the first place!

It may be that dot.coms took considerable time to establish their businesses – much longer then was ever envisaged particularly at the time of the ‘bubble’. Hence those that survived become profitable and desired investments over the long run.

receivership or were liquidated. Approximately 60% that delisted were taken over. In an overwhelming number of cases shareholders in the IPO made either a negligible return or a loss on their initial investment. In a handful of cases shareholders of acquired companies earned large cumulative positive returns. There was no significant difference between the CARs of acquired dot.com and non-dot.com stocks that listed either before or after the correction.
We find no statistically significant difference between the survival of dot.com and non-dot.com companies who made an IPO either before or after the stock market correction of 2000. This result is at odds with previous studies such as that by Cook et al (2003) which suggest IPOs made in ‘hot’ issues markets underperform those in ‘cold’ markets in the long-term. This is a surprising result in need of more investigation.

A possible limitation of our analysis is that we base returns on the offer price not the first day’s closing price. Retail investors may not be able to purchase IPOs at the offer price instead they may have to purchase in the initial trading period. Thus results may not be generalizable across all investor groups.
References


Table 1 Descriptive Statistics IPOs Pre and Post April 14 2000.

<table>
<thead>
<tr>
<th>IPO Type</th>
<th>Pre/Post 14/4/2000</th>
<th>Number of IPOs</th>
<th>Amount Raised (Mean $m)</th>
<th>Total Net Assets (Mean $m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Dot.com</td>
<td>Pre</td>
<td>81</td>
<td>33.64</td>
<td>7.32</td>
</tr>
<tr>
<td>Dot.com</td>
<td>Pre</td>
<td>55</td>
<td>24.08</td>
<td>8.67</td>
</tr>
<tr>
<td>Total</td>
<td>Pre</td>
<td>136</td>
<td>29.77</td>
<td>7.86</td>
</tr>
<tr>
<td>Non-Dot.com</td>
<td>Post</td>
<td>120</td>
<td>26.52</td>
<td>41.10*</td>
</tr>
<tr>
<td>Dot.com</td>
<td>Post</td>
<td>43</td>
<td>23.68</td>
<td>23.04</td>
</tr>
<tr>
<td>Total</td>
<td>Post</td>
<td>163</td>
<td>25.76</td>
<td>35.92</td>
</tr>
<tr>
<td>Total Sample</td>
<td></td>
<td>299</td>
<td>27.62</td>
<td>22.37</td>
</tr>
</tbody>
</table>

* Includes the Australian Wheat Board which had assets of around $2.7 billion.

Table 2 Initial Market Adjusted Returns January 1999 to August 2001

<table>
<thead>
<tr>
<th></th>
<th>Pre Market Correction</th>
<th>Post Market Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whole Sample</td>
<td>Whole Sample</td>
</tr>
<tr>
<td>Mean (Std. Dev.)</td>
<td>58.69 (108.52)</td>
<td>10.46 (44.93)</td>
</tr>
<tr>
<td>Minimum</td>
<td>-49.00</td>
<td>-74.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>730.00</td>
<td>289.00</td>
</tr>
<tr>
<td></td>
<td>Non-dot.com IPOs</td>
<td>Non-dot.com IPOs</td>
</tr>
<tr>
<td>Mean (Std. Dev.)</td>
<td>44.08 (100.09)</td>
<td>12.21 (41.90)</td>
</tr>
<tr>
<td>Minimum</td>
<td>-49.00</td>
<td>-53.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>730.00</td>
<td>289.00</td>
</tr>
<tr>
<td></td>
<td>Dot.com IPOs</td>
<td>Dot.com IPOs</td>
</tr>
<tr>
<td>Mean (Std. Dev.)</td>
<td>80.21 (117.50)</td>
<td>5.60 (52.70)</td>
</tr>
<tr>
<td>Minimum</td>
<td>-29.00</td>
<td>-74.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>610.00</td>
<td>199.00</td>
</tr>
</tbody>
</table>
Table 3 Status of IPOs Listed January 1999 – August 2001, as at December 31st 2010.

<table>
<thead>
<tr>
<th>Period</th>
<th>IPO Type</th>
<th>Listed</th>
<th>Delisted</th>
<th>Percent Delisted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-crash</td>
<td>Non-dot.com</td>
<td>52</td>
<td>29</td>
<td>35.8%</td>
</tr>
<tr>
<td></td>
<td>Dot.com</td>
<td>38</td>
<td>17</td>
<td>30.9%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
<td>46</td>
<td>33.8%</td>
</tr>
<tr>
<td>Post-crash</td>
<td>Non-dot.com</td>
<td>84</td>
<td>36</td>
<td>30.0%</td>
</tr>
<tr>
<td></td>
<td>Dot.com</td>
<td>29</td>
<td>14</td>
<td>32.6%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>113</td>
<td>50</td>
<td>30.7%</td>
</tr>
</tbody>
</table>

Table 4 Cox Proportional Hazard Models of Time to Delisting

<table>
<thead>
<tr>
<th></th>
<th>Non-dot.com</th>
<th>Dot.com</th>
<th>Full Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>p-value</td>
<td>Coefficient</td>
</tr>
<tr>
<td>logSIZE</td>
<td>0.1559</td>
<td>0.038</td>
<td>1.0763</td>
</tr>
<tr>
<td>PRECRASH</td>
<td>0.1106</td>
<td>0.671</td>
<td>0.2119</td>
</tr>
<tr>
<td>MISPRICE</td>
<td>0.2368</td>
<td>0.028</td>
<td>-0.3011</td>
</tr>
<tr>
<td>DOTCOM</td>
<td></td>
<td></td>
<td>-0.0105</td>
</tr>
<tr>
<td>R²</td>
<td>0.024</td>
<td></td>
<td>0.085</td>
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<tr>
<td>Wald test</td>
<td>10.79</td>
<td>0.013</td>
<td>8.77</td>
</tr>
<tr>
<td>Sample Size</td>
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<td>98</td>
</tr>
</tbody>
</table>

*Significant at 1% level
**Significant at 5% level
Chart 1 Initial Underpricing and Market Performance

Percentage Return

All Ords Accumulation Index

-100% 0% 100% 200% 300% 400% 500% 600% 700% 800% 900% 1000% 1100% 1200% 1300% 1400% 1500% 1600% 1700%

Jan-99 Mar-99 May-99 Jul-99 Sep-99 Nov-99 Jan-00 Mar-00 May-00 Jul-00 Sep-00 Nov-00 Jan-01 Mar-01 May-01 Jul-01

Market Adjusted 1st day Return Mean
Chart 2 Cumulative Market Adjusted Average Returns Post Listing

-40.0% 0.0% 20.0% 40.0% 60.0% 80.0%
12 24 36 48 60 72 84 96 108 120

Months Post-Listing

- All IPOs  - Non-dot.com IPOs  - dot.com IPOs
Chart 3 Estimated Survival Function for the Cox Regression.

- **Non-Internet**
- **Internet**