DOES VENTURE CAPITALISTS REPUTATION IMPROVE THE SURVIVAL PROFILE OF IPO FIRMS?

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Does venture capitalists reputation improve the survival profile of IPO firms?

Abstract

This paper examines the effect of Venture Capital (VC) reputation on the survival profile of U.S. Initial Public Offerings (IPOs) firms for the 1985-2005 period. To do so, we construct a VC quality index and develop multinomial logit models based on the information contained in the prospectus. The main findings of the paper are that VC reputation does indeed improve the IPO survival profile. While we find that leaving money on the table is a bad survival signal, we confirm that having a prestigious underwriter to market the issue is a good survival signal. Further, we find that Sarbanes-Oxley Act adoption has a positive effect on IPO survival. We also confirm our result after controlling for self selection bias and estimating an accelerated-failure-time model as robustness tests.

JEL Classification: G32

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Introduction

According to the National Venture Capital Association, "*venture capital firms are professional, institutional managers of risk capital that enable and support the most innovative and promising firms. They fund new ideas that could not be financed with traditional bank financing, that threaten established products and services in a corporation, and that typically require five to eight years to be launched*". Venture capitalists (VCs) provide however more than capital. Jain and Kini (2000, p.1114) note that "*VCs by virtue of their equity participation, and, most instances, board participation have the ability to guide and influence managerial actions in determining strategy, structure and standard operating procedures*". Recently, Sorensen (2007) finds that companies funded by more experienced VCs are more likely to go public. He explains his result by the influence effect, which means that experienced VCs add more value and bring companies public at a higher rate, and by the sorting effect, which means that more experienced VCs invest in better companies. The role of VC in the IPO market is vital and has been the subject of considerable debate in finance. The focus in the literature has been so far on the impact of VC involvement on the short- and long run performance and, on the operating performance of issuers. For examples, Megginson and Weiss (1991) show that the presence of venture capitalists in IPO firms attracts more prestigious investors during road shows and has a certification role of IPO firms. Jain and Kini (1994) observe that VC-backed companies exhibit superior post-IPO operating performance compared to non-VC-backed IPO companies, and Brav and Gompers (1997) confirm higher long-term returns for VC-backed companies.

In this paper, we focus on another effect of VC involvement in the IPO process, namely, its influence on the survival profile of an IPO firm. Few Studies have already

examined the VC involvement in the IPO process. However the question of whether VC reputation improves the survival profile of IPO firms remains a less explored area.

The following are the four distinctive elements covered in our paper. First, while previous studies focus on VC involvement using a VC indicator variable (Jain and Kini, 2000; Hensler et *al.* 1997; Megginson and Weiss, 1991), we construct a VC quality index and examine whether or not entrepreneurs could consider experienced VC to increase their chances of survival on the stock exchange. Second, unlike previous studies that take on the investors' perspective, we take the issuer's perspective. Specifically, in the same spirit as Hensler et *al.* (1997), Boubakri et *al.* (2005) and Kooli and Meknassi (2007) we assess the probability that the firm delists for different outcomes: after going public, the firm thrives to survive, and it can either make it and survive or fail, or be acquired. Determining what factors influence the post issue-transition of the IPO firm into one of the above three post-IPO states can also shed some light on the purposes behind the going public decision. Third, we extend IPO literature by considering the eighties and the nineties using different survival analysis approaches. Specifically, VC's effect on IPO survival could be due to the characteristics of ventures in which venture capitalists invest (Megginson and Weiss, 1991 and Lee and Wahal, 2004). To control for VC selection bias, we use a variation of Heckman's (1979) correction method and consider a battery of robustness tests. Fourth, we examine the impact of Sarbanes-Oxley law[1] on the survival of IPO firms. After a wave of accounting scandals (Enron, Tyco International, Adelphia, Peregrine Systems and WorldCom), SOX was signed in 2002 to introduce significant legislative changes to financial practice and corporate governance. The literature is divergent, however, regarding the costs and benefits of SOX. It will be worth exploring in this paper to examine the effect of SOX on IPO survival.

[1] The Sarbanes-Oxley Act was named after co-creators Senator Paul Sarbanes of Maryland and Representative Michael Oxley of Ohio.

Our results indicate that VC reputation improves the survival profile of IPO firms and that the high level of underpricing increases the likelihood of non-surviving relative to surviving. Also, we find that IPO market activity affects negatively and significantly the probabilities of surviving and being acquired relative to non-surviving. Moreover, we find that another benefit of having a prestigious underwriter to lead the offer is that it improves the probability of survival for IPO firms and that SOX has a positive effect on IPO survival. Further, issuing stocks during hot periods increases the probability of failing or being a target for acquisitions. After controlling for self selection bias and estimating accelerated failure time models as robustness tests, we confirm our previous observations. For instance, we find that a 1% increase in VC quality index results in a 5% increase in the probability of survival.

The paper proceeds as follows. Section 2 discusses the variables and hypothesis. Section 3 describes the sample and method. We present our empirical findings in section 4 and conclude in section 5.

2. REPUTATION HYPOTHESIS AND VARIABLES

2.1 VC reputation hypothesis:

A growing body of literature suggests that VC participation has an impact on post-IPO performance. Gompers (1996) find that VCs engage in grandstanding by taking their companies public before they are ready in order to establish a reputation and successfully raise capital for new funds. Wang et *al.* (2003) find that IPOs backed by older VC firms in Singapore perform better, supporting the grandstanding model.

Further, few studies have examined the survival of IPO firms after going public and very few studies have considered the VC involvement on IPO survivability on the stock exchange. Jain and Kini (2000) analyze the IPO survival with a particular emphasis on the impact of the venture capitalists involvement at the time of the issue on the survival probability. Using a sample of 877 US IPOs issued between 1977 and 1990, they observe a survival rate of 69%,

an acquisition rate of 17% and a failure rate of 14%. Using a multinomial logit model, integrating information available at or prior to the IPO to predict the likelihood of subsequent transition, they find that VC involvement improves the survival profile of IPO issuers by inciting managers to allocate more resources to R&D, by increasing institutional interest during road shows, and by attracting prestigious investment bankers and a larger analyst following. Furthermore, in the event of wanting to pull out their investment in the IPO firm, VCs use their network of contacts to enable an acquisition. In the same vein, Megginson and Weiss (1991) show that venture backed IPOs are able to attract more prestigious investors at the time of road shows and that the presence of venture capitalists in IPO firms has a certification effect. Recently, Krishnan et *al.* (2011) examine six alternative measures of VC reputation and conclude that VC's IPO market share has a positive and significant relation with post-IPO long term performance. They sustain that, while VC baking improves post-IPO success as suggested by the literature, VC reputation is a more important determinant of an issuer's long term performance. More reputable VCs select indeed better venture investments and offer better support and development of their ventures. Another stream of research provides, however, an opposite result. For examples, Brau, Brown, and Osteryoung (2004) study 126 VC backed IPO between 1990 and 1996, and conclude that there is no significant difference in terms of survival between venture and non-venture capital-backed IPOs. Moreover, Jain et *al.* (2008) consider a sample of 160 Internet IPO firms that went public during the 1996-2000 period and estimate Cox Proportional Hazards (CPH) models to analyze the economic significance of factors that influence the post-IPO path-to-profitability. They find that venture capital participation leads to a decrease in the probability of profitability and an increase in the time-to-profitability. (Jain et *al.*, 2008, p.190) note that "*the ability of VCs to exit early reduces their motivation as well as incentives to devote*

resources to monitoring management and providing other value added functions during the post-IPO phase".

Carpentier and Suret (2009) analyze the survival and success of a large sample of Canadian penny stock IPOs launched mostly by small and unprofitable firms from 1986 to 2003 and find that the involvement of a venture capitalist influences the probability of IPO success significantly.

In this paper, rather than focusing on VC involvement using a VC dummy variable as most previous studies did, we examine VC reputation effect on IPO survival by considering a VC quality index. Hsu (2004, p. 1807) notes that "*reputation, which results from prior experience and performance, has been identified as an economically important asset that can generate future rents when information among actors is asymmetric*". Gompers and Lerner (1999) also sustain that VC reputation potentially captures beliefs about future returns. Recently, Nahata (2008) finds that firms backed by more reputable VCs are more likely to exit successfully, access public markets faster, and have higher asset productivity at IPOs. On the basis of the above discussion, we test the following reputation hypothesis: There is a positive relation between the VC reputation and the survival rate of IPO firms.

For VC reputation, many alternative candidates such as VC age, VC cumulative investments, VC capital, VC IPO frequency, and IPO market share have been used in the literature. However, even the VC reputation measures with the greatest predictive power have some limitations. For instance, Sorenson (2007) notes that VC age cannot properly distinguish between active and inactive investors. Krishnan et *al.* (2007) note that IPO market share measure can understate VC firms that focus their investment activity on the initial development stages of a firm's life and less on the later growth stages (IPO stage). Further, some VC firms intentionally invest in a limited set of industries or geographic locations. To alleviate these measures limitations, we measure VC reputation by a VC Quality index. In a

similar fashion to Gompers, Ishii and Metrick (2003) and Campbell and Frye (2006), we construct a quality index for the lead venture capitalists. Specifically, the index is constructed by adding one point if the VC age is above the median, if VC investment is above the median, and if VC IPO market share is above the median. We define VC age as the age of the lead VC computed from the date of its incorporation to the IPO date, VC investment as the dollar amount (in millions) invested by the lead VC, as of the year-end immediately prior to each IPO, and VC IPO market share as VC's dollar market share of all venture backed IPOs in the preceding three calendar years. The data used to calculate each measure is taken from the Thomson Financial Securities. We should note that following Chemmanur and Loutskina (2006), an IPO firm is considered to be backed by a highly reputable VC if it has at least one highly reputable venture firm that invests at least 5% of the total amount of VC invested in the firm.

2.2 Control variables

Following the IPO literature on survival (Kooli and Meknassi, 2007, Boubakri et *al.*, 2005, Jain and Kini, 2000, Hensler et *al.* 1997, among others), we consider the following control variables: IPO Size, level of underpricing, investors demand prior to the issue, underwriter prestige and Industry performance.

3. DATA AND METHOD

3.1 Data

The initial sample of IPO firms is compiled for the period 1985-2005 from the Securities Data Corporation's (SDC) New Issues database. Each firm is tracked until the end of 2005. Our final sample includes 6 235 common shares IPOs. Post IPO outcomes are obtained from the Centre for Research in Security Prices (CRSP) database.

Following Kooli and Meknassi (2007), Boubakri et *al.* (2005), Botman et *al.* (2004), Jain and Kini (2000) and Hensler et *al.* (1997), we consider three post IPO states: survival, being acquired and failure. We define survivors as firms that remain listed on a stock exchange. Acquired firms are firms that are acquired by another public or private firm, or taken private through a leveraged buyout. Non-survivors are firms that are delisted from the stock exchange due to negative reasons.

The Sarbanes Oxley (SOX) was signed in 2002 to introduce significant legislative changes to financial practice and corporate governance. Johnston and Madura (2009) find that initial returns of IPO in the U.S. have declined since SOX and that the aftermarket performance of IPO since SOX is significantly higher. However, the effect of SOX on IPO survival remains a less explored issue. To quantify SOX's effect, we use a dummy variable assigning the value 1 for IPOs after July 2002, and the value 0 otherwise.

Table 1 provides a distribution of post-IPO state for VC and non VC backed IPOs. Overall, we notice that VC backed IPOs tend to be underwritten by more prestigious underwriters. Wang et *al.* (2003) also confirm this observation and sustain that VC firms need high quality underwriters to certify the IPO. Pollock et *al.* (2009) note that "*multiple types of prestigious affiliates are readily found together in some IPOs. Prestigious founders are able to attract prestigious fellow executives and outside directors, who can attract prestigious VCs; together, they can also attract prestigious investment banks to underwrite the offering*." Further, we note that VC backed IPOs are more underpriced than non VC backed IPOs and that Internet and technology IPOs represent the largest category in our VC backed sample.

*** Insert Table 1 about here***

3.2 Method

As Kooli and Meknassi (2007), Boubakri et *al.* (2005), and Jain and Kini (2000), we use a multinomial logit regression model to examine the relation between our independent

variables and the post-IPO status (within three years of IPO). Specifically, we consider the "survivor" category as the reference class and we estimate the following models:

$$\log (P_{NS}/P_S) = \beta_{10} + \beta_{11}X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \ldots + \beta_{1n} X_{1n} \qquad (1)$$

$$\log (P_A/P_S) = \beta_{20} + \beta_{21}X_{21} + \beta_{22} X_{22} + \beta_{23} X_{23} + \ldots + \beta_{2n} X_{2n} \qquad (2)$$

Where P_{NS} is the probability of the "non-survivors" state, P_A is the probability of the being acquired, and P_S is the probability of the "survivors" state. X_1 through X_n are the independent variables.

Jain and Kini (2000, p. 1155) note that "*multinomial logit model allows us to predict whether the event will occur but gives no indication on when the event will occur*". Thus, they recommend the use of a hazard model as described by Cox (1972).

Hazard function H(t) defines the conditional probability of delisting during a short time interval, assuming it has survived up to the present time.

The hazard function is defined by:

$$H(t, X) = \frac{f(t, X)}{1 - F(t, X)} \qquad (3)$$

Where $F(t,X)$ is the probability that an IPO, issued at $t=0$ with characteristics X, has been delisted before the time t ; and $f(t,X)$ the probability density function.

The general form of the hazard model is:

$$H(t, X) = H_0(t) \exp(X\beta) \qquad (4)$$

Where $H_0(t)$ is the baseline hazard function. It provides the hazard probability distribution for IPOs delisting for negative reasons under homogeneous (average) conditions.

B is the vector of parameters to estimate.

X is the vector of independent variables (covariates).

There are several forms of hazard models. In this paper, we use the "*Accelerated Failure Time*" (*AFT*) model. Hensler et al (1997, p. 101) note that "*the AFT model is appropriate when the covariates are assumed to not have a proportional effect on the hazard (probability*

of a negative delisting) or when the hazard is restricted to follow a specific functional form". The dependent variable is the number of months or years an IPO has survived on a period of three years.

Further, we choose the log-logistic distribution as a functional form for the duration to IPO delisting. Mahmood (2000, p. 7) note that "*the log-logistic model appears to yield the best fit among other distributions, such as Weibull, log-normal and exponential distributions*". Using a likelihood-ratio test, we confirm indeed that the log-logistic model fits better our data than other models.

4. EMPIRICAL RESULTS

4.1 Multinomial logit model results

Table 2 reports the results for the multinomial logit model. We find that the coefficient of *VC quality index* is equal to 0.17, and is significantly different from zero at the 5% confidence level. Thus, we confirm that VC reputation improves the survival profile of IPO firms. Indeed, giving the active role of venture capitalists in the management of the firms they backed, their reputation and involvement in the issue are perceived as a positive sign that attracts institutional investors as well as prestigious underwriters. We also find that the reputation of venture capitalists has a positive and significant impact on the probability of being acquired relative to non-surviving (0.24 significant at the 5% confidence level). Further, we notice that a high level of underpricing decreases the likelihood of surviving relative to non-surviving and decreases the probability of being acquired relative to non-surviving. These observations confirm that leaving money on the table is a signal of a risky quality firm.

We also find that IPO market activity affects negatively and significantly the probabilities of surviving and being acquired relative to non-surviving. These results confirm the window of opportunity hypothesis (Ritter, 1991; Loughran and Ritter, 1995). In other word, issuers of

various quality grades profit from periods of high IPO activity, characterized by an increased optimism from investors, to raise funds under advantageous conditions, given an expected poor performance in the long run. Foster-Johnson et *al.* (2000) observe an increase in the market share of low-quality investment banks during hot IPO periods. In addition, we notice that the underwriter's prestige affects positively and significantly the probability of surviving relative to non-surviving and increases the likelihood of being acquired relative to non-surviving. Thus, observations another benefit of having a prestigious underwriter lead the offer is that it improves the probability of survival for IPO firms (Boubakri et *al.*, 2005 and Kooli and Meknassi, 2007). Further, internet IPOs have a negative and significant impact on the probability of surviving relatively to non-surviving and the probability of being acquired relatively to non-surviving. Technology IPOs have however a positive and significant impact on the probability of surviving relatively to non-surviving and the probability of being acquired relatively to non-surviving.

Further, we observe that institutional investors demand prior to the issue affect significantly the probability of surviving relative to non-surviving or the probability of being acquired relatively to non-surviving. Indeed, during the road show and through the bookbuilding mechanism, investors reveal their interests in the IPO and announce to underwriters their "ready to pay" price for the issue. Giving these informations, underwriters have the option to adjust the offer price relatively to the initial price range. In this paper, we confirm that high investor demand affect positively the aftermarket survival of the IPO. Also, we find that the coefficient of Offer size is equal to 0.7, and is significantly different from zero at the 5% confidence level. Thus, we confirm that larger IPOs are more capable to surive than smaller ones. Ritter (1991) and Loughran and Ritter (1995) also suggest that small IPOs are the most speculative and thus are expected to underperform the most in the long term. Interestingly, we find that the SOX adoption has a positive and significant impact of the probability of

surviving relatively to non-surviving and the probability of being acquired relatively to non-surviving.

*** Insert Table 2 about here***

4.2 Robustness tests:

In this section, we discuss additional sensitivity tests to analyse the robustness of our earlier results.

Correction for selection bias using Heckman's procedure

Results from Table 1 show that VC backed IPOs have specific characteristics. Pollock et *al.* (2009) also note that VCs select firms in which to invest. Hence, restricting the analysis to only VC backed IPOs could induce a sample selection problem (Heckman, 1979). To control for a potential sample selection bias, we follow two steps:

First, we estimate a selection model (equation (5)) on the population via a probit model and compute the inverse Mills ratio (*Mills*):

$$\text{Probit}(\text{VCIPO})_i = \alpha_0 + \alpha_1 \text{Control variables} + \varepsilon_i \qquad (5)$$

The probit regression is estimated for the whole population where VCIPO is a latent variable observed only for VC-backed IPOs.

Second, we estimate a multinomial logit model for the subsample of VC backed IPO. We regress the probability of non-survival or to be acquired on VC reputation variable, the inverse Mills ratio (*Mills*) from equation (5), and control variables. We choose the "survivor" category as the reference class against which we contrast the non-survivors and the acquired firms. More specifically, we estimate the following models:

$$\log\left(\frac{P_{NS}}{P_S}\right)_i = \alpha_0 + \alpha_1 \text{VC quality index}_i + \alpha_2 \text{Control variables} + \alpha_3 \text{Mills}_i + \varepsilon_i \quad (6)$$

$$\log\left(\frac{P_A}{P_S}\right)_i = \alpha_0 + \alpha_1 \text{VC quality index}_i + \alpha_2 \text{Control variables} + \alpha_3 \text{Mills}_i + \varepsilon_i \quad (7)$$

Where P_{NS} is the probability of the "non-survivors" state, P_A is the probability of the being acquired, and P_S is the probability of the "survivors" state. Note that if a selection bias is present, the inverse Mills ratio (*Mills*) will have a significant coefficient; VC quality index is the VC reputation measure.

Table 3 reports the results for each step using VC quality index as a proxy for VC reputation. We find that the inverse Mills ratio coefficient is significant, which indicates the presence of a sample selection bias. In other words, we confirm that more reputable VC select better quality firms interms of survivability. More importantly, we find the coefficient of *VC quality reputation* is equal to 0.14, and is significantly different from zero at the 5% confidence level. Thus, we confirm again after controlling for self selection bias that VC reputation improves the survival profile of IPO firms.

*** Insert table 3 about here***

The Accelerated Failure Time model (AFT)

To test robustness of our results, we consider in this section the accelerated-failure-time (*AFT*) model. Table 4 summarizes the log-logistic *AFT* models estimation results for non-survivors firms[2] using VC capital and VC age as VC reputation measures. The general model is the following:

$$\text{Ln}(h_t) = \alpha_0 + \alpha_1 \text{VC quality index}_i + \alpha_2 \text{Control variables} + \alpha_3 \text{Mills}_i + \varepsilon_i \quad (8)$$

VC quality index is the VC reputation and Mills is the inverse Mills ratio.

[2] The model excludes acquired firms from non-survivors sample. Although, including acquired firms as non-survivor firms does not alter our results.

We expect that a positive (negative) coefficient on an explanatory variable indicates that an increase (decrease) in the variable is associated with an increase (decrease) in the survival duration. First, we find again that the inverse Mills ratio coefficient is significant, which indicates the presence of a sample selection bias. Further, we find that the coefficient of VC quality index capital is positive and significant at the one percent level. In other words, the survival duration increases significantly with VC reputation. Also, we find that investors' demand prior to the IPO, Internet and technology IPOs, and underwriter's prestige affect significantly the survival duration. Also, the coefficient of SOX is positive and significant at the one percent level. This latter result suggests that SOX has some beneficial outcomes such as enhancing the survivability of the firm. Table 4 also reports the hazard ratios. In the context of our model, we interpret a hazard ratio for a continuous variable as the estimated percent change in the hazard of the event (survivability) for a one percent increase in the considered covariate and is calculated by subtracting one from the hazard ratio and multiplying by 100 (Allison, 2000). Hazard ratio greater than 1 indicates a positive effect on survival time, while hazard ratio less than one indicates a negative effect on survival time and hazard ratios equals to one indicates that the variable has no impact on survival time.

We find that a one percent increase in the VC capital results in a 5 % increase in the probability of survival. In other words, VC reputation has indeed a positive impact on the likelihood of survivability. Similarly, we find that a one percent increase in institutional investors demand prior to the issue results in a 20% increase in the survival duration. Overall, the *AFT* model results confirm those of the multinomial logit model.

*** Insert table 4 about here***

Figure 1 provides three years plots of the survival function of US IPOs for the 1985-2005 period for both reputed VC and non reputed VC firms (measured by VC quality index). As shown, the probability of surviving is decreasing as the time from the IPO increases. Further,

consistent with the empirical results documented thus far the plot demonstrates that reputed VC-backed IPO firms have a higher survival profile compared to non reputed VC-backed firms. Specifically, the survival function of the prestigious VC- backed IPO firms is for the most part above that of non prestigious VC- backed firms especially as the time from the IPO increases. Overall, we confirm the positive impact of VC reputation on the IPO survival.

*** Insert Figure 1 about here***

Alternative measure of VC reputation

As a further robustness check, we also consider three different measures of VC reputation namely VC age, VC investment share and VC IPO market share. We do not report tables for brevity reasons however, considering these VC reputation measures do not qualitatively affect our previous results. Thus, we confirm that VC age, VC investment share and VC IPO market share have a positive impact on the likelihood of survivability. The positive effect of VC age as a reputation measure on IPO survival is interesting, giving the fact that it confirms the grandstanding hypothesis. In other words, younger VC firms not only bring their portfolios to the market prematurely (e.g. Gompers, 1996), but also do not guarantee their chances of survival on the stock exchange.

5. CONCLUSION

The role of VC in the IPO market is vital and has been the subject of considerable debate in finance. The focus has been so far on the impact of VC involvement on the short- and long run performance and, on the operating performance of issuers. In this paper, we focus on another effect of VC involvement in the IPO process, namely, its influence on the survival profile of an IPO firm. Few studies have already examined this issue. However the question of whether VC reputation improves the survival profile of IPO firms is not considered yet. Specifically, we examine the evolution of U.S. IPO firms and the effect of VC reputation during the 1985-2005 period. To do so, we a construct a VC quality index and develop

multinomial logit models based on the information contained in the prospectus. The main findings of the paper are that VC reputation does indeed improve the IPO survival profile. Prior literature has found that VCs play primarily a certification role during the going public process. In this paper, we find that the active involvement of reputable VCs does not end at the IPO event and help firms to create the post-IPO conditions to survive longer on the stock exchange. Further, we find that a high level of underpricing increases the likelihood of non-surviving relative to surviving and decreases the probability of being acquired relative to non-surviving. In other words, leaving money on the table is a bad survival signal. Also, we find that IPO market activity affects negatively and significantly the probabilities of surviving and being acquired relative to non-surviving. Moreover, we find that another benefit of having a prestigious underwriter leads the offer is that it improves the probability of survival for IPO firms. We also confirm that SOX has a positive effect on IPO survival.

To test the robustness of our results, we control for self selection bias and estimate an accelerated failure time model. We confirm that the survival time for IPOs increases with the VC reputation.

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Table 1: Differences between Sub-samples

The sample consists of 6235 firm commitment IPOs of common shares on the US market for the period 1985-2005. Size = Size of the IPO or gross proceeds in $ millions; Underpricing = Level of underpricing of the IPO measured as (first closing market price – offering price) /offering price; Underwriter's prestige = Dummy variable equals 1 for IPO underwritten by a prestigious underwriter (ranks of 8 and 9), zero otherwise.

	Survivors		Acquired		Non survivors		Total	
	Non-VC backed	VC backed	Non-VC backed	VC backed	Non-VC backed	VC backed	Non-VC backed	VC backed
Panel A: Industry								
Agriculture	0.45%	0.25%	0.29%	0.56%	0.30%	0.43%	0.34%	0.42%
Energy & Mines	2.98%	1.00%	3.51%	0.67%	0.68%	0.65%	2.41%	0.78%
Construction	0.89%	0.12%	0.86%	0.44%	1.73%	0.00%	1.16%	0.23%
Manufacturing	21.39%	26.77%	20.65%	16.24%	26.65%	21.98%	22.86%	21.38%
Transportation & Communication	7.23%	2.24%	5.52%	3.00%	6.61%	3.66%	6.44%	2.86%
Whole sale	3.43%	1.00%	3.66%	2.67%	7.58%	2.37%	4.87%	1.99%
Retail sale	7.60%	4.11%	7.17%	4.00%	9.76%	6.68%	8.16%	4.62%
Finance & Insurance	24.81%	2.74%	23.37%	3.00%	9.61%	1.29%	19.34%	2.54%
Services	9.61%	8.22%	14.19%	10.90%	15.02%	12.93%	12.95%	10.34%
Technology	18.55%	41.10%	16.49%	42.83%	18.62%	34.05%	17.87%	40.30%
Internet	3.06%	12.45%	4.30%	15.68%	3.45%	15.95%	3.61%	14.54%
Panel B: IPO characteristics								
Offer size (million $US)	137.77	61.90	73.52	42.70	26.70	37.50	79.38	48.70
Underpricing (mean)	9.85%	27.49%	13.87%	27.66%	24.49%	27.57%	16.02%	27.58%
Underwriter's prestige	61.25%	76.46%	59.00%	77.64%	25.45%	57.97%	48.76%	72.99%
Total	62.56%	37.44%	60.81%	39.19%	74.16%	25.84%		

Table 2: Multinomial logit model

The sample consists of 6 235 firm commitment IPOs of common shares on the US market for the period 1985-2005. NS = non-survivors, S = survivors, and A = acquired. P_{NS} is the probability of the 'non-survivor' state, P_S the probability of the 'survivors' state, and P_A is the probability of being acquired. Offer size = natural logarithm of the offering size or gross proceeds; Underpricing = level of underpricing of the IPO measured as (first closing market price – offering price) /offering price; Pre-issue demand = investors demand for the stock before the IPO measured as (offering price – Initial range mid price) / Initial range mid price; IPO activity = measured as the number of IPOs during the calendar quarter of the offering; Underwriter's prestige = dummy variable equals 1 for IPO underwritten by a prestigious underwriter (ranks of 8 and 9), zero otherwise; Venture capital = dummy variable equals 1 for venture capital-backed IPO, zero otherwise. SOX = dummy variable equals 1 for IPOs after July 2002, and zero otherwise. VC Quality index is constructed by adding one point if the VC age is above the median, if VC investment is above the median, and if VC IPO market share is above the median. VC age = the age of the lead VC computed from the date of its incorporation to the IPO date. VC investment = the dollar amount (in millions) invested by the lead VC, as of the year-end immediately prior to each IPO. VC IPO market share = VC's dollar market share of all venture backed IPOs in the preceding three calendar years.
***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	$Log(P_S/P_{NS})$		$Log(P_A/P_{NS})$	
	Coefficient	*p*–value	Coefficient	*p*–value
VC quality index	0.17**	0.01	0.24**	0.01
Offer size	0.70***	<0.00	0.46***	<0.00
Underwriter's prestige	0.29***	<0.00	0.61***	<0.00
Underpricing	-0.32***	<0.00	-0.33***	<0.00
Internet	-0.51***	<0.00	-0.28**	0.05
Technology	0.31***	<0.00	0.19**	0.02
Pre-issue demand	0.49**	0.03	0.50**	0.01
IPO activity	-0.01***	<0.01	-0.01***	<0.01
SOX	3.44***	<0.00	0.06	0.91
Intercept	-1.87***	<0.00	-1.40***	<0.00
Pseudo R^2		0.1368		

Table 3: Multinomial logit model after controlling for self-selection

The sample consists of 6 235 firm commitment IPOs of common shares on the US market for the period 1985-2005. NS = non-survivors, S = survivors, and A = acquired. P_{NS} is the probability of the 'non-survivor' state, P_S the probability of the 'survivors' state, and P_A is the probability of being acquired. Offer size = natural logarithm of the offering size or gross proceeds; Underpricing = level of underpricing of the IPO measured as (first closing market price – offering price) /offering price; Pre-issue demand = investors demand for the stock before the IPO measured as (offering price – Initial range mid price) / Initial range mid price; IPO activity = measured as the number of IPOs during the calendar quarter of the offering; Underwriter's prestige = dummy variable equals 1 for IPO underwritten by a prestigious underwriter (ranks of 8 and 9), zero otherwise; Venture capital = dummy variable equals 1 for venture capital-backed IPO, zero otherwise. SOX = dummy variable equals 1 for IPOs after July 2002, and zero otherwise. VC Quality index is constructed by adding one point if the VC age is above the median, if VC investment is above the median, and if VC IPO market share is above the median. VC age = the age of the lead VC computed from the date of its incorporation to the IPO date. VC investment = the dollar amount (in millions) invested by the lead VC, as of the year-end immediately prior to each IPO. VC IPO market share = VC's dollar market share of all venture backed IPOs in the preceding three calendar years. Mills = inverse Mills ratio derived from the first stage probit estimation.

***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Stage 1 (*selection model*)		Stage 2 (*multinomial logit model*)			
			$Log(P_S/P_{NS})$		$Log(P_A/P_{NS})$	
	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
VC quality index			0.14**	0.01	0.22**	0.02
Offer size	-0.05**	0.02	0.56***	<0.00	0.34***	<0.00
Underwriter's prestige	0.76***	<0.00	2.40**	0.03	2.45**	0.01
Underpricing	0.16***	<0.00	0.05	0.80	0.00***	1.00
Internet	1.05***	<0.00	2.18	0.12	2.07	0.11
Technology	0.68***	<0.00	2.19**	0.02	1.84**	0.04
Pre-issue demand	0.06	0.60	0.58**	0.01	0.58**	0.01
IPO activity	0.00*	0.07	-0.01***	<0.00	-0.01*	0.07
SOX	0.28***	<0.00	4.20***	<0.00	0.73	0.26
Mills			3.50***	0.04	3.05*	0.07
Intercept	-1.39***	<0.00	-8.32**	0.01	-7.02**	0.02
Pseudo R^2	0.1414		0.1371			

Table 4: Log-logistic AFT Model after controlling for self-selection

The sample consists of 6 235 firm commitment IPOs of common shares on the US market for the period 1985-2005. NS = non-survivors, S = survivors, and A = acquired. P_{NS} is the probability of the 'non-survivor' state, P_S the probability of the 'survivors' state, and P_A is the probability of being acquired. Offer size = natural logarithm of the offering size or gross proceeds; Underpricing = level of underpricing of the IPO measured as (first closing market price – offering price) /offering price; Pre-issue demand = investors demand for the stock before the IPO measured as (offering price – Initial range mid price) / Initial range mid price; IPO activity = measured as the number of IPOs during the calendar quarter of the offering; Underwriter's prestige = dummy variable equals 1 for IPO underwritten by a prestigious underwriter (ranks of 8 and 9), zero otherwise; Venture capital = dummy variable equals 1 for venture capital-backed IPO, zero otherwise. SOX = dummy variable equals 1 for IPOs after July 2002, and zero otherwise. VC Quality index is constructed by adding one point if the VC age is above the median, if VC investment is above the median, and if VC IPO market share is above the median. VC age = the age of the lead VC computed from the date of its incorporation to the IPO date. VC investment = the dollar amount (in millions) invested by the lead VC, as of the year-end immediately prior to each IPO. VC IPO market share = VC's dollar market share of all venture backed IPOs in the preceding three calendar years. Mills = inverse Mills ratio derived from the first stage probit estimation.

***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Variable	*AFT model*: Survival vs. Non-survival			*AFT model*: Survival vs. Acquired		
	Coefficient	*p*-value	Hazard ratio	Coefficient	*p*-value	Hazard ratio
VCquality index	0.05***	0.02	1.05	0.19**	0.03	1.20
Offer size	-0.04	0.20	0.96	0.08	0.33	1.08
Underwriter's prestige	0.93**	0.04	2.55	1.84*	0.09	6.28
Underpricing	0.12	0.17	1.13	0.13	0.49	1.14
Internet	1.17**	0.04	3.21	3.05**	0.03	21.03
Technology	0.86**	0.03	2.37	1.50	0.12	4.46
Pre-issue demand	0.18**	0.04	1.20	-0.40*	0.04	0.67
IPO activity	-0.01	0.49	1.00	0.01	0.25	1.00
SOX	3.07***	<0.00	21.59	0.16	0.74	1.18
Mills	1.56**	0.04	4.76	2.63*	0.09	13.85

Figure 1: Survival function. The sample consists of 6235 firm commitment IPOs of common shares on the US market for the period 1985-2005. Y-axis represents probabilities and x-axis represents survival time in years.