

Grandstanding in the venture capital industry: new evidence from IPOs and M&As

Salma Ben Amor* and Maher Kooli**

Abstract

We provide new evidence on the grandstanding hypothesis by considering initial public offerings (IPOs) as well as mergers and acquisitions (M&As) exits for venture capital (VC) firms from 1995 to 2015. After correction for selection bias, we find that an exit strategy by acquisition has the same importance as an IPO in explaining incentives of young venture capital firms to grandstand. There is, however, no evidence that young VC firms exit companies closer to the next follow-on fund than older VCs. Our results show that, to build their reputation, young VC firms are willing to bear the cost of higher underpricing in the case of IPO exits and to accept a lower premium in the case of M&A exits. We also find that the presence of reputed VC affects significantly the probability of an IPO exit over an acquisition exit.

JEL: G32, G34

Keywords: Initial public offerings, M&A, Venture Capital, Grandstanding

* Professor of finance at the Université du Québec en Outaouais - Campus Saint Jérôme, 5 Rue Saint-Joseph, Saint-Jérôme, Québec, CANADA J7Z 0B7; Tel: +1 450.530.7616, ext. 4116; Email: salma.benamor@uqo.ca

** Professor of finance at the School of Management, CDPQ Research Chair in Portfolio Management, Université du Québec à Montréal, Department of Finance. Corresponding author, 315 Rue Sainte-Catherine Est, Montréal, Québec, CANADA H2X 3X2, Tel: +1 514.987.3000, ext. 2082, Fax: +1 514.987.0422, Email: kooli.maher@uqam.ca

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1. Introduction

Experience and reputation are important factors in raising capital, especially for venture capital firms. A common concern of venture capitalists (VCs) is the need to deliver positive returns to maintain existing limited partners, to attract new investors, and to raise new funds. Prior research considers that the common indicator of VC firm reputation is its IPO success. Lerner (1994) and Gompers (1995) document that venture capital-backed companies yield the highest return for venture investors when they go public. Nahata (2008) finds that firms backed by more reputable VCs are more likely to exit successfully and can access public markets more quickly. Studies that infer the quality of the venture from the number of firms brought public, however, do not consider the case of M&As as an exit channel. Gompers (1996) argues that the most effective way for young venture capitalists to signal their ability to potential investors is to bring one of the portfolio companies public in an IPO. According to Gompers (1996), young VCs have a strong reason to grandstand by bringing firms public earlier than older VCs to establish a reputation and raise capital for new funds. Lee and Wahal (2004) confirm the grandstanding hypothesis and find that VC firms are willing to bear the cost of underpricing when they take a company public to establish their reputation and raise more funds in the future. Butler and Goktan (2013) examine VC backed IPOs and the role of inexperienced VCs and find that young VC firms have a comparative advantage at producing “soft information” about relatively opaque start-up companies.¹ They conclude that the need for soft information production could be an explanation to why start-up companies would have a demand for young VC firms that are likely to grandstand.

Although an IPO is an attractive exit mechanism to realize returns, VC firms also have the alternative of cashing out via an acquisition, a merger, or a trade sale. The appeal of M&As has become popular over the past decade. According to the National Venture Capital Association (NVCA) 2016 Yearbook, there were more exits by VCs through

¹ According to Butler and Goktan (2013), the term “soft information” represents the type of information that VC firms generate about their portfolio companies through the use of their own network.

acquisitions than via IPOs for the period between 1985 and 2015 (see Figure 1). Furthermore, acquisitions of venture-backed firms with disclosed values accounted, on average, for \$25.43 billion between 2004 and 2014, while IPOs of venture-backed firms accounted for \$10.25 billion. This decline in venture-backed IPOs is in line with an overall decline in the IPO market. For instance, Gao, Ritter, and Zhu (2013) report that in the U.S., the average of IPOs per year dropped from 310 IPOs per year during 1980-2000 to only 99 IPOs per year during 2001-2012. Doidge, Karolyi, and Stulz (2013) confirm that compared to other countries, the rate of small-firm IPO activity in the U.S. was low in the 2000s. Furthermore, Bayar and Chemmanur (2011) and Bayar and Chemmanur (2012) confirm that an IPO is not always the best way to exit and that over the last decade, a privately held firm was much more likely to have been acquired than to go public. Masulis and Nahata (2011, p. 398) point out that “ (...), while IPOs are generally viewed as the most profitable VC exit, acquisitions can also be very profitable, and can be the only profitable exits in periods when the IPO market is weak or effectively closed.” The popular press also highlighted many examples of the preference for M&As over IPOs as an exit route for venture-backed firms. For example, “Forget IPOs, firms want to get bought” (Wall Street Journal, November 2015, p. C1),² and “Forget IPO. The new goal? Get acquired” (Inc., September 2012).³ According to Bayar and Chemmanur (2011), the upward trend in M&As exits indicates that the costs to private firms to go public via IPO rather than to get acquired have risen significantly in recent years. Given these key changes and the importance of the exit decision to entrepreneurs and VCs, it is interesting to further our understanding on the role of VC reputation and to examine whether young VCs need to successfully sell privately held firms earlier than older VCs to establish a

² “Forget Going Public, U.S. Companies Want to Get Bought (Wall Street Journal, November. 29, 2015)

<http://www.wsj.com/articles/forget-going-public-u-s-companies-want-to-get-bought-1448793190>

³ “Forget IPO. The new goal? Get acquired” (Inc., September 2012)

<http://www.inc.com/eric-markowitz/forget-ipo-the-new-goal-get-acquired.html>

reputation. It is also interesting to examine if VC reputation affects the exit choice between IPOs and acquisitions.

To answer these questions, we collect data on U.S. venture capital exits by IPOs and M&As between 1995 and 2015. Empirical tests for a sample of 609 venture-backed IPOs and 830 venture-backed M&As support grandstanding predictions. Specifically, our results show that younger VC firms have strong incentives to exit earlier than older VC firms through IPOs as well as M&As. We also find that the flow of capital into the lead VC firm is positively related to the VC age and the number of IPOs or M&As done by the VC firm. This result indicates that each additional successful exit attracts more capital for a young VC firm than for a well-established VC firm.

Our study contributes to the existing literature on how young VC firms grandstand in several ways and the importance of VC reputation.⁴ First, previous work focuses mainly on IPOs. However, IPOs occur in about 10% of VC investments as an exit route, whereas M&As occur approximately in about 20%. Further, as noted by Nahata (2008, p. 141) *“Although the ‘going public’ decision has been extensively studied both theoretically and empirically, limited research exists on the acquisitions of private firms, particularly those that are VC-backed.”* Masulis and Nahata (2011) also note that an analysis on VC backed acquisitions is lacking. In this study, we aim to fill this gap in the literature by examining the grandstanding hypothesis using both U.S. IPOs and M&As.

Second, Gompers (1996), considers an IPO sample between 1978 and 1987 and finds that young VC firms raise capital significantly sooner after the date of the IPO. The behavior of young VCs, however, could be due to the quality of the privately held companies they are financing rather than to their reputation. To address endogeneity concerns, we use Heckman’s (1979) correction procedure on a large dataset that covers the 1995-2015 period and includes IPOs as well as M&As. We find that venture-backed acquisitions should be of the same importance as venture-backed IPOs in explaining the grandstanding of young

⁴ Our study also complements Nahata and Krishnan et al. (2011). Nahata (2008) focuses on VC reputation and investment performance, while Krishnan et al. (2011) focus on VC reputation and post-IPO long run performance.

venture capitalists. We also add nuance to Gompers (1996)'s finding that young VC firms will raise future capital sooner than old venture firms. Using a Cox hazard analysis to control for the time between the IPO or the M&A exit and the next follow-on fund, we find that more experienced venture capitalists raise capital sooner after a successful exit by IPO or acquisition. In other words, VC reputation shortens the time of raising new capital. Indeed, while reputational concerns could be a driver for young VC firms to raise future funds quickly after the exit, experience, skills and networks of well-established VC firms could help them to easily find capital providers as soon as possible after the exit, in line with Hochberg, Ljungqvist, and Lu (2007).

Third, our paper contributes to a growing literature that examines the role of VC. Much of this literature agrees on the fact that VCs do not only provide capital to young high growth companies, they also provide screening, monitoring, certification, investment expertise, networking, and promoting innovation and growth ((Lerner (1995), (Megginson and Weiss (1991), Hellmann and Puri (2002) Nahata (2008), Krishnan et al. (2011), Hochberg, Ljungqvist, and Lu (2007), and Chemmanur, Krishnan, and Nandy (2011), Bernstein, Giroud, and Townsend (2016), and Gill and Walz (2016) among others). Thus, VC reputation is an important asset to carry out these objectives. According to Gompers (1996), for young VCs firms to build their reputation, they are willing to incur the costs of higher underpricing. Underpricing is an indirect cost for VC firms and represents a wealth transfer from existing shareholders (including VCs) to new ones. Lee and Wahal (2004) also argue that IPO underpricing and IPO size are two measures by which venture capital firms can signal their reputation. We complement this IPO evidence by examining the case of M&A exits. To make the parallel with underpricing for IPOs, we investigate the effect of the VC reputation on the acquisition premium and find a positive and significant relation between the acquisition premium and the VC reputation. Thus, less reputed VCs could bear the cost of building their reputation by negotiating less and accepting a lower premium than more established VCs. Our result also confirms Masulis and Nahata (2011)'s evidence that as young VCs are under strong pressure to establish a

successful track record in venture investing, they are willing to accept lower acquisition prices to obtain profitable exits sooner.

Fourth, in addition to analyzing the grandstanding hypothesis, we dig deeper into the role of VC and examine whether the most reputable VCs will choose to take their companies public rather than to sell them to potential acquirers. Our findings thus add to the literature examining the exit choice for private firms and help us to better understand the differences between two important exit routes.

The remainder of this paper proceeds as follows. Section 2 describes our data and provides comparative and descriptive statistics. Section 3 describes our empirical tests and results. Section 4 provides further tests, and Section 5 concludes.

2. Data sources, sample selection and descriptive statistics

In this section, we present our data sources and highlight some descriptive statistics for our retained sample. We build this study on data which come from different sources. First, we obtain our data on VCs from the Thomson One Private Equity Database provided by Thomson Financial. We focus on all U.S. venture capital exits by taking a firm public in an IPO or selling it to a public acquirer between January 1995 and December 2015. We exclude all exits for which venture capital firms could not be identified and collect data about dates and sizes of new funds by tracking the fundraising history of U.S. venture capital firms. To the extent that venture capitalists often syndicate their investments with other venture firms, we are interested in the lead venture capitalist. If the company is financed by more than one venture capital firm, we track the fundraising history for the lead investor. We identify the lead venture capitalist as the venture investor with the earliest and largest investment. If two firms provide the same amount of funding in the first round, we consider the firm with the largest investment by cumulating the amount invested across all financing rounds. We also eliminate venture-backed exits in which the size and date of the next fund raised could not be identified for the lead venture capitalist. Second, we crosscheck our data and complete the information on IPOs and M&As with the New Issues database (for IPOs) and M&A database (for acquisitions), also provided

by Thomson Financial. Our final sample contains 609 U.S. VC-backed companies that exit through IPOs and 824 U.S. VC-backed companies that exit through acquisitions.

To test the grandstanding hypothesis, we distinguish between companies backed by young venture capital firms and those backed by more established venture capitalists based on two measures of venture capital reputation.⁵ We form two groups of companies for venture-backed IPOs and venture-backed acquisitions. The first measure is the venture capital firm's age. For comparison purposes, we follow Gompers (1996) and classify all lead venture capital firms under six years old at the exit date (by IPO or acquisition) as "young" and those six years old or more as "old". However, giving our sample period and the foundation date of almost venture capital firms in our sample, taking six years as a cutoff age would not give us accurate conclusions, contrary to Gompers (1996), where the sample period is between 1978 and 1987. Thus, we also classify all lead venture capital firms under 10 years old as young and those 10 years old or more as experienced venture capitalists. Sørensen (2007) argues, however, that VC age cannot accurately distinguish between active and inactive investors. Therefore, we consider the number of previous IPOs or M&As conducted by the lead venture capital firm as a second measure of VC reputation. Specifically, we consider venture capitalists with the number of previous IPOs or M&As under the median as young and those with the number of previous IPOs or M&As equal to or over the median as old.

We follow much of the existing IPO and M&A literature by considering several control variables. See the Appendix for more detailed variable definitions.

As a preliminary data investigation, we report descriptive statistics for the IPO and M&A samples. Tables 1, 2, and 3 present summary information for IPOs and M&As backed by young and old venture capital firms, using cutoff ages of 6 years old and 10 years old,

⁵ The extant literature has considered many alternative measures for VC reputation. For examples, Nahata (2008) considers the cumulative market capitalization of IPOs backed by the VC firm in the IPO market and the VC's share of aggregate investment in the VC industry. Krishnan et al. (2011) consider IPO market share, IPO frequency, VC age, VC capital, and cumulative IPO market share. For robustness, we also re-estimate our main results using different alternative candidates as VC reputation measures and they remain qualitatively similar.

respectively, and the median number of previous IPOs and M&As. First, we find that young venture capital firms exit their companies sooner than more established venture capitalists, regardless of the measure of reputation used. For example, the time to exit by IPOs for lead venture capital firms under six years old is 3.3 years, compared to 4.6 years for old venture capitalists (see Table 1). The difference in means is statistically significant at the 1% level. The results for venture-backed acquisitions show that the average time from investment to exit is even shorter for young venture capital firms. Specifically, we find that venture capital firms under 6 years old take on average 2.25 years to exit by acquisition, compared to 4.9 years for more experienced venture capitalists. The difference in means is also statistically significant at the 1% level. When we consider the full sample, we find that younger venture capital firms have an incentive to exit the firm in which they have invested through IPOs as well as through acquisitions as soon as possible (2.72 years for young VCs vs. 4.77 years for older VCs), confirming the grandstanding hypothesis.

Second, unlike Gompers (1996), our results show that there is no evidence that young venture capital firms exit companies closer to the next follow-on fund. Specifically, we find no significant differences between the average time from the IPO to the next follow-on fund for young and old venture capital firms when we consider a cutoff age of 6 years old (see Table 1). Furthermore, when we consider a cutoff age of 10 years old, we find that, on average, older venture capitalists bring companies public 14 months prior to the next follow-on fund, compared to 19 months for younger venture capitalists. The difference in means is statistically significant at the 5% level (see Table 2).

Using the number of previous IPOs as an alternative VC reputation measure, we find that reputed venture capital firms bring companies public 12 months prior to the next follow-on fund, while less reputed VC firms bring companies public 18 months prior to the next follow-on fund. The difference in means is significant at the 1% level (see Table 3). In other words, our results show that young venture capital firms take more time to raise a new fund following their IPO exit.

Testing the grandstanding hypothesis using the acquisition sample, we find no significant differences in the time between selling companies to a public acquirer and the next follow-

on fund. Our results show that it takes almost 18 months on average before venture capital firms succeed in raising a new fund, regardless of their age or the number of previous deals. Tables 1, 2 and 3 also report average (median) maturity of companies at the exit date. When we consider the 10-year-old cutoff age (see Table 2), for example, we find that the average age of the VC-backed company is 5.6 years at the IPO date for young venture capitalists and 7.48 years for more established venture capitalists. We also find that the average age of the VC-backed company is 6.89 years at the acquisition date for young venture capital firms and 8.6 years for old venture capitalists. Both mean differences are statistically significant at the 1% level. These results support the grandstanding hypothesis for the IPO and acquisition samples. We also confirm these observations using a cutoff age of 6 years old and the median number of previous IPOs and M&As as VC reputation measures (see Tables 1 and 3).

Our results show that experienced venture capitalists are able to raise more money immediately after their exit by IPO or acquisition. For example, taking the 10-year-old cutoff age, we find that the average size of the next follow-on fund is \$556.17 million for old venture capitalists versus \$293.80 million for young venture capital firms when the exit strategy is the IPO. If venture capital firms choose to exit by acquisition, the average size of the next follow-on fund is \$576.76 million for old venture capitalists, while it is \$235.96 million for young venture capital firms (see Table 2).

Tables 1, 2 and 3 also show that companies venture-backed by young venture capitalists and going public in IPOs are more underpriced. For example, we find that the average (median) underpricing is 51.34% (22.42%) for companies backed by young venture capitalists, while it is 34.30% (15.00%) for companies backed by older venture capital firms (see Table 2). We also find that the average offering size is smaller for IPOs brought to market by young venture capitalists and that companies taken public by more established venture capital firms tend to engage more prestigious underwriters, although these results are not statistically significant. When VC exit through acquisitions, we find that the average deal value is smaller for transactions involving young venture capital firms. For example, we find that the average (median) deal value is \$143.39 million (\$73.16 million)

for acquisitions involving young venture capitalists compared to \$168.49 million (\$93 million) for those involving old venture capital firms. The difference in means is not significant, but the difference in medians is statistically significant at the 5% level (see Table 1). Our results also show that the average acquisition premium is higher if an experienced VC firm is involved in the acquisition deal. For example, we find that the average acquisition premium is 19.58% for companies backed by more experienced VC firm compared to 11.79% for those backed by young VC firm, although those results are not statistically significant (see Table 1).

To test the effect of the target company and the public acquirer being in the same industry, we use *Relatedness*, a dummy variable taking the value of 1 if the company acquired is in the same three digits SIC code as the public acquirer, and 0 otherwise. Our univariate results show that young venture capital firms are more likely to sell the company to a public acquirer who is in the same industry.

[Insert Tables 1, 2, and 3 here]

3. Empirical Analysis

To formalize our univariate analysis, we run a set of regressions using two different dependent variables: (1) the logarithm of the size of the next fund raised by the lead venture capital firm and (2) the time from the market exit to the lead venture capitalist's next fund. We estimate regressions for both IPO and M&A samples.

4.1. IPO exit

Previous studies have confirmed that younger VC firms have strong incentives to exit earlier than older VC firms through IPOs. The behavior of young VCs, however, could be due to the quality of the privately held companies they are financing rather than to their reputation. To address endogeneity concerns, we use Heckman's (1979) correction procedure. In the first step selection equation, we estimate the likelihood of reputable VCs making their investment in privately held companies. Thus, we consider an indicator variable denoting whether the lead VC is young or old (more established) as a dependent variable. As instruments, we consider IPO firm age, VC syndicate size, IPO firm total assets, lead VC size, number of companies lead VC has invested in, and VC investment

stage. Let's note that to be valid instruments, these variables must be significant in the 1st step selection equation (but not significant in the 2nd step equation). In the second stage, we regress the size of the next fund raised by the lead VC on the VC reputation measure including a set of control variables and the inverse Mills ratios (IMR) obtained from the first step. As primary explanatory variables, we use VC age and the total number of previous IPOs conducted by the lead VC (*VC previous IPOs*). For the VC firm's age, we consider (1) *VC age dummy*, a dummy variable equals 1 if the lead venture capital firm is under 10 years old, and 0 otherwise, and (2) $\ln(\text{VC age})$, the logarithm of the venture capital firm's age in years.

Following previous studies, we consider several control variables in the regressions. We include the total number of IPOs in the previous four months and the value-weighted CRSP market return for the year of the IPO as control variables related to the fundraising activity of venture capital firms and market condition. We also control for the underwriter's prestige using an updated of Carter and Manaster (1990) ranking. Gompers (1996) suggests that young venture capital firms are willing to incur the costs of higher underpricing to build their reputation. Underpricing is an indirect cost for VC firms. It represents a wealth transfer from existing shareholders (including VCs) to new ones. Lee and Wahal (2004) also argue that IPO underpricing and IPO size are two measures by which venture capital firms can signal their reputation. Thus, we include these two variables in our regressions. Further, we include firm age to control for firm characteristics and VC syndicate size, fraction of equity held by the lead VC after the IPO, and VC fund type to control for VC characteristics. Although not reported, we include industry and calendar fixed effects in all regressions. *T*-statistics appear in parentheses and are based on standard errors robust to heteroscedasticity and adjusted for industry clustering.

Formally, we have:

1st step selection equation (Probit):

$$\text{Prob (VC reputation measure for IPOs/M\&As)} = a_0 + a_1 \text{ Control variables} + e, \quad (1)$$

2nd step:

$$\text{Size of the next fund raised by the lead VC for IPOs/M\&As} = b_0 + b_1(\text{VC reputation measure for IPOs/M\&As}) + b_2 \text{ Control Variables} + b_3 \text{ IMR} + n \quad (2)$$

Table 4 reports the results for the IPO sample. The results from the selection equation estimation show that VC reputation is significantly related to IPO firm age, to VC syndicate size, to lead VC size, to lead VC investment experience, and to VC investment stage. Specifically, we find that an investment by a reputable VCs is more likely if the privately held firm is old, if the VC syndicate is large, if the lead VC has more investment experience measured by the number of companies it has invested in, and if the VC investment occurred when the portfolio company was not at an early/seed stage of development lifecycle. All these instruments are statistically significant at the 1% level.

In models 1 through 3, we separately include our VC reputation measures. Specifically, in model 1 of Table 4, we include *VC age dummy* variable as a first measure of VC reputation. We find that the coefficient of *VC age dummy* is negative and statistically significant at the 5% level (-0.919, *t*-statistic= -2.464), indicating that the amount of capital raised by VC firms under 10 years old is smaller than the capital raised by more reputable venture capitalists. We also confirm this result using the logarithm of the venture capital firm's age instead of the VC dummy variable (model 2). The coefficient of $\ln(\text{VC age})$ is positive and significant at the 1% level (0.511, *t*-statistic= 4.058). Thus, more experienced venture capital firms are able to raise more capital. In model 3, we consider the number of previous IPOs by the lead VC firm as a measure of VC reputation. We find that the number of previous IPOs by the lead venture capital firm is positively and significantly related to the size of next fund raised after the IPO. The coefficient of *VC previous IPOs* is positive and significant at the 1% level (0.245, *t*-statistic= 3.089). This result confirms that the amount of capital raised by venture capitalists is sensitive to the number of previous IPOs, consistent with the grandstanding hypothesis. It also suggests that more experienced VC firms are able to raise more capital. The inverse Mills ratio derived from the specification equation is statistically significant at the 1% level, confirming the importance to control for the selection bias related to the VC's choice of privately held companies. We also find that the coefficient of the fraction of equity held by lead VC after IPO is positive and

significant at the 5% level. Thus, the commitment of lead VCs after IPO helps them to raise more capital. In model 4 through 6, we replace *Underpricing* by *IPO size* to avoid multicollinearity between both variables and confirm our previous results. As before, we continue to find that lead VC reputation has a positive and significant effect on the size of next fund.

[Insert Table 4 here]

We next analyze the likelihood and timing of rising money for follow-on funds after the date of the IPO using a Cox hazard model, proposed by Cox (1972), where the logarithm of the time from the IPO to the lead venture capitalist's next fund is the dependent variable. The basic model assumes the following form:

$$h_i(t) = \lambda_0(t) \exp\{\beta_1 x_{i1} + \dots + \beta_k x_{ik}\} \quad (3)$$

Where $h_i(t)$ is the conditional hazard rate defined as the probability of rising money for follow-on funds after the date of the IPO. $\lambda_0(t)$ is the baseline hazard function and the second part of the equation is the exponentiated set of k covariates for firm i. The results of the estimated Cox proportional hazards models are reported in Table 5. Since the dependent variable is the logarithm of the hazard rate, a positive (negative) coefficient on an explanatory variable indicates that changes in that variable decrease (increase) the time from the IPO to the lead venture capitalist's next fund.

We find that VC reputation has a negative impact on the time of raising capital for follow-on funds. In other words, VC reputation shortens the time of raising new capital. The coefficient of Ln(VC age) is negative and statistically significant at the 10% level (model 1). Thus, in contrast to Gompers (1996)'s observation, more experienced venture capitalists raise capital sooner after the IPO. This observation is in line with Hochberg, Ljungqvist, and Lu (2007) who find that better-networked VC firms experience significantly better fund performance, as measured by the proportion of investments that are successfully exited through an IPO or a sale to another company. Further, we find a negative relation between the underwriter's prestige and the time of raising capital for follow-on funds. The coefficient of *Prestige* is negative and statistically significant at the 5% (except in model

1). Thus, prestigious underwriters help VCs to stay active. Again, the inverse Mills ratio derived from the specification equation is statistically significant at the 1% level, confirming the importance to control for the selection bias. We also find that the higher the underpricing, the longer time VC firms take after the IPO date to raise money for follow-on funds. The coefficient of *Underpricing* in models 1, 2, and 3 of Table 5 are positive and significant at the 1% level. Overall, our regression analysis results confirm that reputation affects VC future fundraising.

[Insert Table 5 here]

4.2. M&A exit

We estimate regressions of the size of the next fund raised by the lead venture capital firm immediately after the M&A exit in Table 6. In models 1 through 3, we separately include the three measures of VC reputation. In models 4 through 6, we replace *Acquisition premium* by $\ln(\text{Deal value})$.

We consider the same set of control variables as for the IPO sample. We also include *Relatedness* to control for the effect of the target company and the public acquirer being in the same industry. We also use Heckman correction procedure and include the inverse Mills ratio to control for the selection bias.

In model 1, the coefficient of *VC age dummy* is negative and significant at the 1% level (-0.056, t -statistic = -2.563), suggesting that venture capital firms over 10 years old are significantly able to raise more capital after successfully selling the company to a public acquirer. Using the logarithm of venture capitalists' age (model 2), we find that the coefficient of $\ln(\text{VC age})$ is positive and significant at the 10% level (0.033, t -statistic = 1.825), confirming that more reputable venture capital firms are able to raise more capital. In model 3 of Table 6, we find that the total number of previous M&As is significantly and positively related to the size of the next follow-on fund. This result confirms that each additional exit by M&A helps VC firms attain more reputation and succeed in raising more money for future investments, once again supporting the grandstanding hypothesis. Furthermore, we find that the coefficient of *Acquisition premium* is positive and significant in models 1, 2 and 3. Thus, negotiating a better acquisition premium will help VCs to raise

more capital immediately after the acquisition exit. Table 6 also shows that venture capital firms participating in large deals are significantly able to raise more capital. The coefficient of $\ln(\text{Deal value})$ is positive and significant at the 10% level in models 4 and 5. Again, the coefficient of the inverse Mills ratio is statistically significant for all models indicating the importance of controlling for the selection bias. Overall, results in Table 6 show that exit via acquisitions is as important as exit via IPOs in explaining VC fundraising.

[Insert Table 6 here]

In Table 7, we estimate the time between the M&A exit and the next follow-on fund by lead VC in the Cox hazard framework. We find that VC reputation has a significant impact on the time between the M&A exit and the next follow-on fund. For instance, the coefficient of *VC age dummy* is positive and significant at the 5% level (model 1) while the coefficients of $\ln(\text{VC age})$ and *VC previous M&As* are negative and statistically significant at the 10% level (models 2 and 3). Thus, more experienced venture capitalists raise capital sooner after a successful exit by acquisition. In other words, VC reputation shortens the time of raising new capital.

We also find that independent VCs are significantly able to quickly raise new funds following the acquisition. The coefficient of *Fund type=1* is negative and significant at the 5% (models 1, 2, 3, and 6). Nahata (2008) points out that corporate VCs are generally less experienced in venture financing than traditional VCs. Chemmanur, Loutskina, and Tian (2014) also provide the evidence that CVCs firms are younger, riskier, and less profitable than independent VC.⁶ Masulis and Nahata (2011) point out that CVC have weaker financial incentives which makes them more risk averse and more worried to exit their investments. Overall, we confirm that selling private firms to public acquirer is as important as taking it public through an IPO to build VC reputation.

[Insert Table 7 here]

4. Further analysis

⁶ Also, see Chemmanur, Loutskina, and Tian (2014) for a detailed comparison between CVC and independent VC and Ivanov and Xie (2010) for an examination of the added value of CVCs relative to independent VCs.

In this section, we dig deeper into the role of VC. In particular, we examine the correlation between VC firm reputation and IPO or M&A timing. We also explore the effect of VC reputation on underpricing, acquisition premium, and IPO or M&A deal size.

4.1. IPO or M&A timing

Our descriptive statistics reported in Tables 1, 2 and 3 show that the time between the first lead venture capital investment and the IPO or the M&A date is significantly shorter for young venture capitalists. We also find that companies backed by new venture capital firms are younger than those backed by more established venture capitalists. In this subsection, we analyze the correlation between VC firm reputation and IPO or M&A timing. We consider (1) the time to exit and (2) the company age at the IPO or M&A exit as timing measures and run a set of regressions using VC reputation measures as independent variables. We use an accelerated failure time (AFT) model to test the relation between VC reputation and time to exit. One feature of this model is that the baseline hazard function follows an assumed density function based on prior expectations. Based on Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) results, we assume that the baseline hazard function follows a log-logistic density function. Hence, we estimate a log-logistic AFT model where the dependent variable is the number of years between the exit date and the first investment date by the lead venture capital firm. A positive (negative) coefficient on an explanatory variable indicates both a higher (lower) probability of survival as well as an increasing (decreasing) expected duration. Specifically, we estimate the following AFT model:

$$\ln(T) = b_0 + b_1(\text{VC reputation measure for IPOs/M\&As}) + b_2\text{Control Variables} + n \quad (4)$$

Where T is the duration of VC backed firm before exit. The estimation results are reported in Table 8. Panel A of Table 8 reports regression results for IPOs. We find that young venture capital firms take companies public earlier than old venture capitalists. The negative and significant coefficient of *VC age dummy* variable suggests that venture capital firms under 10 years old take less time to bring companies to the market by IPOs than more established VCs. We also find that duration before exit is positively and significantly

related to $\ln(VC\ age)$ and $VC\ previous\ IPOs$, confirming that more experienced VC take their time before exit.

These results support the grandstanding hypothesis. Further, we find that there a positive and significant relation between *Fund type* and *Time to exit*, confirming that independent VCs do not rush their exit. As noted by Chemmanur, Loutskina, and Tian (2014), independent VCs are structured as limited partnerships and have full control over the capital committed by their limited partners.

When we consider the company age at exit as a dependent variable, we find a negative and significant relation between the IPO company age and the VC's age. The coefficients of all our VC reputation measures are statistically significant at the 1% level, suggesting that companies backed by young venture capital firms are younger than those backed by more reputable VCs. Once again, these results favor the grandstanding explanation.

Panel B of Table 8 reports regression results for M&As using the time to exit and the company age at the M&A exit as dependent variables. We find that the duration before exit is significantly shorter for young venture capitalists than more established venture capitalists. The coefficient of *VC age dummy* is negative and statistically significant at the 1% level (-0.344, t -statistic = -6.275), suggesting that venture capital firms under 10 years old exit through acquisitions earlier than old venture capitalists. Similarly, we find that coefficients of $\ln(VC\ age)$ and $VC\ previous\ M\&As$ are positive and significant at the 1% level. Thus, the logged survival time (and hence the expected duration) is an increasing function of the venture capital firm's age. Using firm age at exit as a dependent variable, we find that companies acquired by public acquirers backed by venture capital firms under 10 years old are younger than those backed by more experienced venture capitalists. The coefficient of *VC age dummy* is negative and statistically significant at the 1% level (-0.214, t -statistic = -3.723). We also find the coefficient of $\ln(VC\ age)$ is positive and significant at the 1% level (0.130, t -statistic= 3.194) and the coefficient of $VC\ previous\ M\&As$ is positive and significant at the 10% level (0.130, t -statistic= 3.194), suggesting

that VC's reputation is associated with a higher company age at the acquisition date. Overall, these results are consistent with the grandstanding hypothesis.

[Insert Table 8 here]

4.2. IPO underpricing, M&A premium and VC reputation

Earlier, we noted that venture capital firms are willing to incur the costs of higher underpricing to build their reputation. In this sub-section, to further examine this result, we run a set of regressions using underpricing and IPO size as dependent variables. We also separately consider different VC reputation measures as independent variables and we control for IPO characteristics.

Panel A of Table 9 reports regression results for the IPO exit. We find that the coefficient of *VC age dummy* (model 1) is positive and significant at the 5% level (0.138, t -statistic=2.391). Thus, we confirm that companies backed by young venture capital firms are associated with higher underpricing. Using the logarithm of the venture capital firm's age (model 2), we also confirm that greater underpricing is significantly associated with younger venture capital firms. Our results imply that young venture capital firms could incur the cost of higher underpricing if they are looking to increase their reputation to raise more capital.

Furthermore, the control variable $\ln(IPO\ age)$ has a negative and statistically significant coefficient, confirming that younger IPO firms are more underpriced than older IPO firms. We also find in model 1 that the underwriter's prestige has a negative and significant effect on the level of underpricing. Using IPO size as an alternative measure of reputation signal does not alter our conclusions (models 4, 5, and 6). Our results are, however, not statistically significant.

In panel B of Table 9, we examine the M&A sample. To make the parallel with the IPO sample, we consider M&A premium and deal size. We run a set of regressions using M&A premiums (models 1, 2 and 3) and M&A deal sizes (models 4, 5, and 6) as dependent variables. We also separately consider different VC reputation measures as independent variables and we control for M&A characteristics. The results show that there is a positive and significant relation between M&A premium and VC reputation. Thus, less reputed

VCS could bear the cost of building their reputation by accepting a lower premium than more established VCs. We also find that younger VCs participate in small deals to build their reputation (models 4, 5, and 6). The positive coefficients of VC reputation are not, however, significant. Further, we find that *Fund type* has a negative and statistically significant coefficient, confirming Ivanov and Xie (2010)'s result that targets with CVC backing tend to receive higher takeover premiums than their counterparts with independent VC backing.

[Insert Table 9 here]

4.3. VC reputation and the exit choice (IPOs vs. M&As)

Previous studies such as Brau, Francis, and Kohers (2003), Poulsen and Stegemoller (2008), Ball, Chiu, and Smith (2011), and Bayar and Chemmanur (2012) have examined the determinants of exit choice for privately held firms. Bayar and Chemmanur (2011) present a theoretical model to study the situation of an entrepreneur managing a private firm backed by a VC. Nahata (2008) examines whether VC reputation confers performance benefits to their portfolio companies and finds that companies led by more reputable VCs are more likely to exit successfully. Poulsen and Stegemoller (2008) conclude that VCs backing has an effect on the exit choice. Ball, Chiu, and Smith (2011) find that the choice of an M&A exit over an IPO exit is negatively related to subsequent market returns and that acquirers may turn to M&A for lack of better alternatives. They do not, however, find that firm-specific market timing affects the choice between IPO and M&A exit. In this subsection, we extend previous analyses by empirically examining the effect of VC reputation on exit choice (IPOs vs. M&As). The exit likelihood is regressed on VC reputation along with the other independent variables used in previous tests. The dependent variable is a dummy variable which equals 1 if the private firm goes public and 0 if it is acquired. Formally, we estimate the following logistic model:

$$\text{Prob (1 if IPO or 0 if M\&A)} = b_0 + b_1 \text{ VC reputation measure for IPOs/M\&As} + b_2 \text{ Control variables} + e \tag{5}$$

The results are presented in Table 10. We find that the coefficient of *VC age dummy* (model 1) is positive and statistically significant at the 1% level (1.210, *t*-statistic = 9.723),

the coefficient of $\ln(VC\ age)$ (model 2) is negative and statistically significant at the 10% (-0.154, t -statistic = -1.881), and the coefficient of total $VC\ previous\ IPOs\ and\ M\&As$ (model 3) is negative and statistically significant at the 5% level (-0.002, t -statistic = -2.484). Thus, VC reputation affects positively and significantly the probability of an IPO exit over an acquisition exit. Overall, these observations confirm the importance of VC reputation on the likelihood of exits via IPOs or acquisitions. They are also in line with Nahata (2008), who finds a positive relation between VC's share of cumulative IPO capitalization and the probability of an IPO exit over an acquisition exit.

We also find that larger firms are more likely to go public. The coefficient of $\ln(firm\ age)$ is positive and statistically significant at the 5% level. Further, we find that market return has a positive and significant effect on the probability of an IPO exit over an acquisition exit. The coefficient of $CRSP\ value\text{-}weighted\ return$ is positive and statistically significant at the 1% level (models 1, 2, and 3). Brau, Francis, and Kohers (2003) also confirm the effect of the "hotness" of the IPO market relative to the takeover market on the decision to go public versus to be acquired. Furthermore, the coefficient of $\ln(VC\ syndicate\ size)$ is positive and statistically significant at the 1% level (models 1, 2, and 3). Thus, privately held companies that are backed by larger VC syndicates are more likely to go public than to be acquired.

We also find that firms that receive their VC funding in the early/seed stage of development lifecycle are more likely to be acquired. The coefficient of $VC\ investment\ stage$ is negative and significant at the 1% level (models 1, 2, and 3). This result is in line with Bayar and Chemmanur (2011)'s suggestion that later stage firms, more viable against product market competition are more likely to go public, while earlier stage firms, less viable against product market competition, are more likely choose to be acquired.

[Insert Table 10 here]

5. Conclusion

Previous literature on the venture capital industry has often considered that the most effective way for a VC firm to signal its quality is to conduct a successful IPO. However,

the appeal of M&As has become popular over the last decade. Masulis and Nahata (2011) point out that on average IPOs occur in about 10% of VC investments, whereas M&As occur approximately in 20% of VC investments. Despite this upward trend of M&A as an exit route, studies on the role of VC on acquisitions of privately held firms remain scarce. We help fill this gap by examining the grandstanding hypothesis via IPOs as well as via M&As for VC firms from 1995 to 2015. Our results show that not only taking companies public by IPOs has an effect on young venture capitalists' reputation and their ability to raise more capital but also succeeding to sell the company to a public acquirer is an important channel for young venture capital firms to easily access new investments and to build their reputation. Thus, the desire to grandstand is similar in young venture capital firms conducting IPOs or M&As. Our results are robust to different VC reputation measures and controlling for selection issue.

We also find that for venture capital firms choosing to exit by IPOs, the size of the next fund raised depends on the number of IPOs previously financed by the VC and VC age. Similarly, for venture capital firms choosing to exit by selling the company to a public acquirer, the size of next fund raised depends on the number of M&As previously financed and VC age. Furthermore, we find that IPO or M&A timing is associated with reputational concerns. The time it takes a company backed by a young venture capital firm to be acquired is even less than the time it takes to go public by IPO. This result suggests that an exit strategy by acquisition has the same importance as an IPO in explaining incentives of young venture capital firms to grandstand.

Unlike Gompers (1996), we find no evidence that young venture capitalists were able to raise more capital quickly after an IPO or an M&A than more established venture capitalists. While reputational concerns could be a driver for young VC firms to raise future funds quickly after the exit, experience, skills, and networks of well-established VC firms could help them to easily find capital providers as soon as possible after the exit (Hochberg, Ljungqvist, and Lu (2007)). Moreover, we find that to build their reputation, young VC firms are willing to bear the cost of higher underpricing in the case of IPO exits

and to accept a lower premium in the case of M&A exits. We also find that independent VCs are significantly able to quickly raise new funds following the acquisition.

In addition to testing the grandstanding hypothesis, this study illustrates the importance of considering both IPOs and M&As as exit channels for privately held firms. It also examines the effect of VC reputation on exit choice and confirms that the presence of a reputed VC significantly affects the probability of an IPO exit over an acquisition exit.

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Appendix. Definitions of the variables used in this paper

Variables	Definitions
<u>VC reputation:</u>	
VC age dummy	Dummy variable taking the value of one if the lead venture capitalist is less than ten years old, else zero.
Ln(VC age)	The natural logarithm of the lead venture capital firm's age in years
VC previous IPOs or M&As	Total number of previous IPOs or M&A conducted by the lead venture capital
<u>IPO or M&A characteristics:</u>	
Underpricing	The difference between the first day closing price and the offer price given as a percentage of the offer price
IPO size	The natural logarithm of the total capital raised at the time of the IPO
Prestige	Dummy variable set to one if the IPO lead underwriter has an updated Carter and Manaster (1990) of eight or more, else zero.
Ln(IPO or M&A age)	The natural logarithm of company's age at the effective date of the IPO or M&A in years
Ln(Assets)	The natural logarithm of the total asset of the IPO or target firm
Acquisition premium	A proxy defined as the total deal value divided by the total sales of the target before the announcement date.
Ln(Deal value)	The natural logarithm of acquisition deal value
Relatedness	Dummy variable taking the value of one if the company acquired is in the same three digits SIC code as the public acquirer, else zero.
<u>Market conditions</u>	
CRSP value-weighted return	The value-weighted CRSP market return for the year of the IPO or M&A.
Total IPOs in the previous four months	The cumulative number of IPOs in the previous four months
Total M&As in the previous four months	The cumulative number of M&As in the previous four months
<u>VC characteristics</u>	
Time to exit	The time between the first investment date by the lead venture capital firm and the exit date (IPO or M&A)
VC syndicate size	The size of VC syndicate
Fund type	Dummy variable set to one if VC is independent and zero if it's a corporate investor
Fraction of equity held by lead VC post-IPO	Fraction of equity held by lead VC post-IPO
Number of companies lead VC has invested in	Number of companies lead VC has invested in
VC investment stage	Dummy variable set to one if VC invested at early/seed stage, else zero

Figure 1
 IPOs and M&As activities between 1995 and 2015, according to the National Venture Capital Association (NVCA)

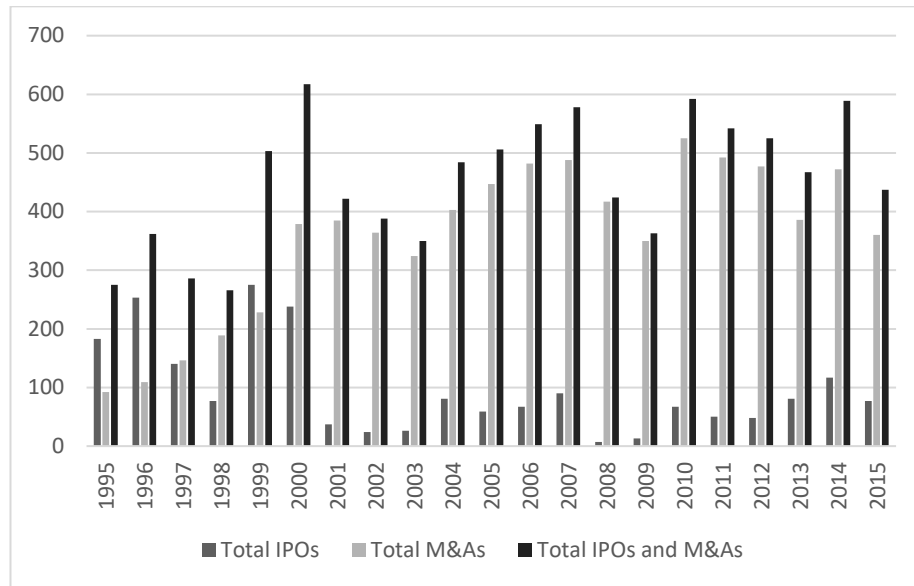


Table 1

Descriptive statistics of IPOs and M&As backed by young and old venture capital firms classified using a cutoff age of six years old

The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. Variable definitions are provided in the Appendix. **, *, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	IPO exit			M&A exit			All sample		
	VC less than 6 years old at the IPO	VC with 6 years old and greater at IPO	p-value of no diff test	VC less than 6 years old at the M&A	VC with 6 years old and greater at M&A	p-value of no diff test	VC less than 6 years old at the exit	VC with 6 years old and greater at exit	p-value of no diff test
Average time to exit	3.3 (2.15)	4.60 (3.90)	0.001 (0.000)	2.25 (1.8)	4.90 (4.4)	0.000 (0.000)	2.72 (2)	4.77 (4.1)	0.000 (0.000)
Average time from exit to next follow-on fund	18.10 (7.5)	14.98 (9.83)	0.20 (0.16)	18.51 (11.43)	18.63 (11.98)	0.96 (0.94)	18.31 (9.3)	17.10 (11)	0.000 (0.004)
Average size on next follow-on fund	288.03 (155.37)	527.63 (270)	0.02 (0.003)	204.54 (118.02)	529.75 (250)	0.000 (0.29)	244.09 (126.71)	528.86 (259.89)	0.83 (0.06)
Average age of VC backed companies at exit	4.96 (4.19)	7.36 (5.98)	0.000 (0.000)	6.14 (3.75)	8.44 (6.60)	0.01 (0.000)	5.57 (4.02)	7.98 (6.34)	0.000 (0.000)
Average number of previous M&A	16.5 (9)	58.26 (43)	0.000 (0.000)	12.08 (6)	68.61 (52)	0.000 (0.000)	14.17 (7)	64.22 (48)	0.009 (0.012)
Average number of previous IPO	10.29 (5)	39.71 (24)	0.000 (0.000)	4.15 (1)	36.62 (22)	0.000 (0.000)	7.06 (2)	37.93 (23)	0.033 (0.053)
Average number of total exits	26.79 (14)	95.24 (64)	0.000 (0.000)	16.23 (7.5)	100.28 (71)	0.000 (0.000)	21.23 (10)	98.17 (68)	0.000 (0.000)
Average syndicate size	7.65 (7)	8.12 (7)	0.48 (0.67)	4.45 (5)	6.11 (4)	0.000 (0.000)	5.96 (5)	6.96 (6)	0.01 (0.01)
Average offering size	90.91 (73.60)	146.51 (75.9)	0.56 (0.01)						
Average M&A deal value				143.39 (73.16)	168.49 (93)	0.50 (0.04)			
Relatedness				0.62 (1)	0.50 (1)	0.04 (0.04)			
Average underpricing	65.34 (34.70)	48.22 (20.58)	0.08 (0.04)						
Average premium				11.79 (5.99)	19.58 (6.66)	(0.41) (0.89)			
IPO Underwriter prestige	8.00 (8.00)	8.29 (8.50)	0.11 (0.17)						
Number	72	536		80	744		152	1281	

Table 2

Descriptive statistics of IPOs and M&As backed by young and old venture capital firms classified using a cutoff age of ten years old

The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. Variable definitions are provided in the Appendix. **, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	IPO exit			M&A exit			All sample		
	VC less than 10 years old at the IPO	VC with 10 years old and greater at IPO	<i>p</i> -value of no diff test	VC less than 10 years old at the M&A	VC with 10 years old and greater at M&A	<i>p</i> -value of no diff test	VC less than 10 years old at the exit	VC with 10 years old and greater at exit	<i>p</i> -value of no diff test
Average time to exit	3.48 (2.60)	4.69 (3.9)	0.000	3.22 (2.9)	5.07 (4.5)	0.000	3.33 (2.8)	4.91 (4.2)	0.000
Average time from exit to next follow-on fund	19.01 (10.21)	14.34 (9.53)	0.01	18.73 (12.01)	18.58 (11.9)	0.93	18.84 (11.63)	16.76 (10.76)	0.10
Average size on next follow-on fund	293.80 (150)	556.17 (282.8)	0.001	235.96 (126.33)	576.76 (268.62)	0.000	259.67 (129.75)	567.92 (275)	0.000
Average age of VC backed companies at exit	5.60 (4.62)	7.48 (6.08)	0.000	6.89 (5.35)	8.61 (6.62)	0.008	6.36 (5.04)	8.13 (6.42)	0.000
Average number of previous M&A	9.75 (5.5)	43.68 (29)	0.000	15.15 (10)	77.60 (63)	0.000	15.40 (9.5)	71.65 (58)	0.000
Average number of previous IPOs	15.77 (9)	63.89 (50.5)	0.000	5.28 (2)	41.98 (27)	0.000	7.13 (3)	42.72 (28)	0.000
Average number of total exits	25.53 (15)	104.19 (75)	0.000	20 (12)	113.74 (86)	0.000	22.26 (14)	109.64 (81)	0.000
Average syndicate size	7.31 (7)	8.28 (6)	0.07	4.95 (5)	6.25 (4)	0.000	5.92 (5)	7.12 (6)	0.000
Average offering size	90.27 (70.75)	156.84 (77.62)	0.38			0.03			
Average M&A deal				162.22 (72.25)	167.20 (99)	0.84			0.04
Relatedness				0.53 (1)	0.51 (1)	0.70			0.70
Average underpricing	51.34 (22.42)	34.30 (15.00)	0.006			0.03			
Average premium				12.65 (5.74)	21.13 (6.28)	0.13			1.02
IPO underwriter prestige	7.93 (8.00)	8.06 (8.01)	0.35			0.56			
Number	132	477		190	634		322	1111	

Table 3

Descriptive statistics of IPOs and M&As backed by young and old venture capital firms classified using the median number of previous IPOs and M&As. The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. Variable definitions are provided in the Appendix. **, ***, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	IPO exit			M&A exit			All sample		
	VC with previous IPOs less than the median	VC with previous IPO equal or greater than the median	p-value of no diff test	VC with previous M&A less than the median	VC with previous M&A equal or greater than the median	p-value of no diff test	VC with total num. of exits less than the median	VC with total num. of exits equal or greater than the median	p-value of no diff test
Average time to exit	4.21 (3.35)	4.55 (3.9)	0.23 (0.03)	4.06 (3.4)	5.15 (4.6)	0.000 (0.000)	4.13 (3.4)	4.97 (4.3)	0.000 (0.000)
Average time from exit to next follow-on fund	18.33 (11.2)	12.55 (8.71)	0.000 (0.008)	19.21 (12.15)	18.26 (11.06)	0.52 (0.16)	18.46 (12.13)	16.01 (9.8)	0.02 (0.003)
Average size on next follow-on fund	306.54 (171.05)	641.14 (303.1)	0.000 (0.000)	300.21 (135)	682.36 (330)	0.000 (0.000)	328.56 (148.74)	666.63 (320)	0.000 (0.000)
Average age of VC backed companies at exit	6.69 (5.25)	7.41 (6.17)	0.01 (0.009)	8.37 (6.34)	8.07 (6.48)	0.59 (0.27)	7.65 (5.81)	7.81 (6.30)	0.66 (0.01)
Average number of previous M&As							16.83 (15)	97.18 (83)	0.000 (0.000)
Average number of previous IPOs							7.53 (6)	59.34 (51)	0.000 (0.000)
Average number of total exits							22.65 (19)	156.52 (138)	0.000 (0.000)
Average offering size	96.71 (73.02)	181.77 (75.68)	0.23 (0.21)						
Average M&A deal				147.44 (61.26)	171.88 (72.87)	0.27 (0.69)			
Relatedness				0.55 (1)	0.50 (1)	0.98 (0.98)			
Average underpricing	45.84 (17.90)	40.99 (16.20)	0.41 (0.16)						
Average premium				17.40 (5.86)	22.21 (7.01)	0.34 (0.47)			
Underwriter prestige	7.96 (8.00)	8.11 (8.01)	0.19 (0.85)						
Number	296	298		392	397		712	721	

Table 4

Regressions for the logarithm of the size of the next fund raised by the lead venture capital firm after IPO

The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. Variable definitions are provided in the Appendix. **, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Prob(VC reputable =1)	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-4.970*** (-8.964)	4.720*** (3.501)	2.704* (1.898)	3.780** (2.546)	4.762*** (3.173)	4.193** (2.258)	4.336** (2.415)
VC age dummy		-0.919** (-2.464)			-0.910** (-2.436)		
Ln(VC age)			0.511*** (4.058)			0.650*** (3.361)	
VC previous IPOs				0.245*** (3.089)			0.232*** (2.675)
Underpricing		0.058 (0.560)	0.066 (0.642)	0.086 (0.848)			
IPO size					0.006 (0.046)	-0.091 (-0.630)	-0.079 (-0.545)
Prestige		-0.105 (-0.554)	-0.099 (-0.536)	-0.065 (-0.377)	-0.113 (-0.602)	-0.084 (-0.446)	-0.079 (-0.423)
Ln(IPO age)	0.363*** (3.321)	-0.197 (-1.146)	-0.138 (-0.830)	-0.294* (-1.674)	-0.209 (-1.221)	-0.350* (-1.834)	-0.338* (-1.782)
CRSP value-weighted return		4.884 (0.850)	4.530 (0.807)	6.523 (1.035)	4.791 (0.828)	0.413 (0.062)	5.885 (0.852)
Total IPOs in the previous four months		0.002 (0.796)	0.002 (1.000)	0.000 (0.185)	0.002 (0.794)	0.001 (0.295)	0.000 (0.191)
Ln(syndicate size)	0.300*** (2.832)	-0.250 (-1.554)	-0.198 (-1.266)	-0.411*** (-2.724)	-0.250 (-1.548)	-0.287* (-1.724)	-0.425*** (-2.596)
Fraction of equity held by lead VC post-IPO		0.016** (2.100)	0.018** (2.452)	0.023*** (3.205)	0.015** (2.079)	0.026*** (3.305)	0.022*** (2.871)
Fund type dummy		0.140 (0.487)	0.230 (0.815)	-0.034 (-0.150)	0.143 (0.497)	0.066 (0.261)	-0.048 (-0.198)
Inverse Mills ratio		-1.324*** (-5.190)	-1.174*** (-4.662)	-1.717*** (-4.322)	-1.325*** (-5.193)	-1.922*** (-4.775)	-1.858*** (-4.227)
Ln(IPO assets)	-0.046 (-0.886)						
Ln(lead VC size)	0.324*** (4.722)						
Ln(number of companies lead VC has invested in)	0.339*** (3.378)						
VC investment stage	-0.446*** (-3.223)						
Industry and year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
Wald test		67.14	80.97	77.94	67.00	72.41	64.37
No. of observations	523	523	523	505	523	521	505

Table 5

Regressions for time from IPO to the lead venture capital firm's next fund
The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. Variable definitions are provided in the Appendix. **, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Prob(VC reputable =1)	(1)	(2)	(3)	(4)	(5)	(6)
VC age dummy		0.105 (0.687)			0.092 (0.593)		
Ln(VC age)			-0.125* (-1.780)			-0.123* (-1.745)	
VC previous IPOs				-0.010 (-0.203)			-0.004 (-0.069)
Underpricing		0.217*** (4.046)	0.217*** (4.013)	0.219*** (4.065)			
IPO size					0.083 (1.263)	0.079 (1.196)	0.079 (1.183)
Prestige		-0.220* (-1.928)	-0.228** (-1.997)	-0.234** (-2.005)	-0.245** (-2.150)	-0.253** (-2.226)	-0.260** (-2.234)
Ln(IPO age)	0.312*** (2.801)	-0.090 (-1.059)	-0.086 (-1.019)	-0.097 (-1.121)	-0.131 (-1.552)	-0.126 (-1.503)	-0.138 (-1.623)
CRSP value-weighted return		-0.063 (-0.195)	-0.106 (-0.325)	-0.076 (-0.232)	-0.030 (-0.091)	-0.078 (-0.235)	-0.046 (-0.136)
Total IPOs in the previous four months		0.002*** (2.643)	0.002*** (2.593)	0.002*** (2.601)	0.002*** (2.988)	0.002*** (2.924)	0.002*** (2.919)
Ln(syndicate size)	0.249*** (2.370)	-0.078 (-1.057)	-0.082 (-1.103)	-0.093 (-1.214)	-0.043 (-0.590)	-0.047 (-0.643)	-0.056 (-0.743)
Fraction of equity held by lead VC post-IPO		-0.003 (-0.633)	-0.002 (-0.503)	-0.002 (-0.587)	-0.003 (-0.626)	-0.002 (-0.481)	-0.002 (-0.579)
Fund type dummy		-0.043 (-0.289)	-0.056 (-0.376)	-0.002 (-0.011)	-0.043 (-0.289)	-0.059 (-0.394)	-0.004 (-0.028)
Inverse Mills Ratio		-0.457*** (-4.560)	-0.518*** (-4.823)	-0.449*** (-3.490)	-0.423*** (-4.273)	-0.488*** (-4.550)	-0.411*** (-3.206)
Ln(IPO assets)	-0.031 (-0.591)						
Ln(lead VC size)	0.283*** (3.651)						
Ln(number of companies lead VC has invested in)	0.338*** (3.171)						
VC investment stage	-0.451*** (-3.360)						
Industry and year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
Wald test		43.69	46.35	42.69	31.53	34.18	30.18
Loglikelihood		-2561	-2559	-2450	-2567	-2565	-2457
No. of observations		516	516	497	516	516	497

Table 6

Regressions for the logarithm of the size of the next fund raised by the lead venture capital firm after acquisition

The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. Variable definitions are provided in the Appendix. **, *, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Prob(reputable VC =1)	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-4.730*** (-11.164)	6.573*** (10.912)	6.416*** (7.942)	4.485*** (4.491)	2.779 (1.423)	2.279 (1.139)	3.465*** (3.698)
VC age dummy		-0.056*** (-2.563)			-0.099* (-1.867)		
Ln(VC age)			0.033* (1.825)			0.146** (1.970)	
VC previous M&As				0.418** (2.531)			0.463*** (3.018)
CRSP value-weighted return		-0.343 (-0.801)	-0.288 (-0.670)	-0.379 (-0.887)	3.682 (0.484)	3.812 (0.502)	-0.698* (-1.778)
Total M&As in the previous four months		0.001 (0.851)	0.001 (0.765)	0.001 (0.979)	0.001** (2.153)	0.001** (2.119)	0.001 (1.258)
Ln(MA'age)	0.018 (0.242)	-0.072 (-0.681)	-0.087 (-0.704)	-0.114 (-0.952)	-0.040 (-0.363)	-0.032 (-0.288)	-0.196* (-1.842)
Acquisition premium		1.666** (2.889)	1.740*** (3.011)	1.794*** (3.148)			
Ln(Deal value)					0.072* (1.685)	0.072* (1.696)	0.044 (1.023)
Relatedness		0.226 (1.510)	0.229 (1.527)	0.265* (1.779)	0.174 (1.298)	0.188 (1.398)	0.274** (1.978)
Ln(syndicate size)	0.265*** (2.895)	-0.473*** (-3.282)	-0.473*** (-3.283)	-0.475*** (-3.451)	-0.443*** (-3.421)	-0.446*** (-3.479)	-0.387*** (-3.070)
Fund type dummy		0.858*** (3.175)	0.868*** (3.233)	0.861*** (3.235)	0.941*** (3.921)	0.935*** (3.910)	1.151*** (4.663)
Inverse Mills ratio		-1.484*** (-6.564)	-1.475*** (-6.328)	-1.282*** (-5.436)	-1.380*** (-6.528)	-1.334*** (-6.205)	-1.023*** (-4.510)
Ln(MA'assets)	1.065 (1.535)						
Ln(lead VC size)	0.230*** (4.272)						
Ln(number of companies lead VC has invested in)	0.571*** (6.873)						
VC investment stage	-0.395*** (-3.428)						
Industry and year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
Wald test		36.47	36.52	43.61	103.12	104.16	50.77
No. of observations	739	739	739	739	815	815	815

Table 7

Regressions for time from M&A to the lead venture capital firm's next fund
The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. Variable definitions are provided in the Appendix. **, *, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Prob (VC reputable =1)	(1)	(2)	(3)	(4)	(5)	(6)
VC age dummy		0.238** (2.110)			0.229** (2.296)		
Ln(VC age)			-0.128* (-1.671)			-0.115* (-1.695)	
VC previous M&As				-0.109* (-1.876)			-0.088* (-1.760)
CRSP value-weighted return		0.844*** (3.372)	0.830*** (3.310)	-2.370 (-0.421)	-3.862 (-0.826)	-4.005 (-0.858)	-4.571 (-0.964)
Total M&As in the previous four months		0.001*** (4.241)	0.001*** (4.146)	0.001 (0.688)	0.001 (0.803)	0.002 (0.705)	0.002 (0.682)
Ln(MA'age)	0.086 (1.162)	-0.098 (-1.467)	-0.100 (-1.515)	-0.022 (-0.315)	-0.037 (-0.627)	-0.046 (-0.797)	-0.048 (-0.781)
Acquisition premium		0.231 (0.776)	0.223 (0.730)	0.226 (0.678)			
Ln(Deal value)					0.031 (1.180)	0.033 (1.256)	0.019 (0.678)
Relatedness		-0.061 (-0.691)	-0.074 (-0.845)	-0.069 (-0.747)	-0.045 (-0.578)	-0.057 (-0.737)	-0.068 (-0.811)
Fund type dummy		-0.352** (-2.420)	-0.358** (-2.458)	-0.342** (-2.244)	-0.247* (-1.890)	-0.237* (-1.817)	-0.292** (-2.131)
Ln(syndicate size)	0.278*** (3.141)	-0.044 (-0.581)	-0.039 (-0.495)	-0.016 (-0.195)	-0.018 (-0.261)	-0.010 (-0.146)	-0.017 (-0.235)
Inverse Mills ratio		-0.234*** (-3.101)	-0.221*** (-2.908)	-0.301*** (-2.890)	-0.268*** (-3.853)	-0.252*** (-3.612)	-0.328*** (-3.490)
Ln(MA'assets)	1.018*** (2.970)						
Ln(lead VC size)	0.241*** (3.890)						
Ln(number of companies lead VC has invested in)	0.603*** (5.771)						
VC investment stage	-0.393*8* (-3.691)						
Industry and year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
Wald test		48.28	46.72	67.67	88.14	85.86	91.04
Loglikelihood		-3064	-3065	-2903	-4100	-4102	-3880
No. of observations		629	629	604	806	806	771

Table 8

Regressions on the time to exit and firm age at the exit

The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. Variable definitions are provided in the Appendix. **, ***, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: IPO regressions	(1)	(2)	(3)	(4)	(5)	(6)
	Time to exit (years)			firm age at exit		
Constant	1.111*** (6.461)	0.522** (2.515)	0.875*** (5.033)	2.545*** (20.365)	2.179*** (13.274)	2.348*** (16.840)
VC age dummy	-0.303*** (-4.027)			-0.239*** (-4.257)		
Ln(VC age)		0.151*** (3.155)			0.090*** (2.761)	
VC previous IPOs			0.058** (2.356)			0.058*** (3.083)
Prestige	-0.040 (-0.617)	-0.044 (-0.663)	-0.062 (-0.883)	-0.004 (-0.067)	-0.010 (-0.165)	-0.023 (-0.370)
CRSP value-weighted return	-0.064 (-0.354)	-0.044 (-0.247)	-0.020 (-0.101)	-0.032 (-0.200)	-0.013 (-0.078)	-0.009 (-0.052)
Total IPOs in the previous four months	-0.003*** (-7.390)	-0.003*** (-6.928)	-0.003*** (-7.300)	-0.001*** (-4.687)	-0.001*** (-4.342)	-0.002*** (-4.695)
Ln(syndicate size)	0.266*** (5.551)	0.281*** (5.916)	0.260*** (5.595)	-0.169*** (-4.429)	-0.158*** (-4.124)	-0.177*** (-4.485)
Fraction of equity held by lead VC post-IPO	0.001 (0.517)	0.002 (0.527)	0.001 (0.287)	-0.004 (-1.636)	-0.003 (-1.499)	-0.004* (-1.741)
Fund type dummy	0.183** (2.049)	0.224** (2.543)	0.206** (2.329)	0.077 (1.139)	0.102 (1.506)	0.088 (1.280)
Industry and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	592	592	569	592	592	569
Adjusted R ²	0.10	0.09	0.08	0.08	0.06	0.07

Panel B: M&A regressions	(1)	(2)	(3)	(4)	(5)	(6)
	Time to exit (years)			firm age at exit		
Constant	0.746*** (5.238)	-0.047 (-0.291)	0.200 (1.335)	1.991*** (11.474)	1.564*** (8.029)	1.774*** (9.880)
VC age dummy	-0.344*** (-6.275)			-0.214*** (-3.723)		
Ln(VC age)		0.255*** (6.698)			0.130*** (3.194)	
VC previous M&As			0.121*** (6.334)			0.042* (1.745)
CRSP value-weighted return	0.303** (2.307)	0.284** (2.180)	0.305** (2.426)	-0.035 (-0.237)	-0.036 (-0.240)	-0.026 (-0.169)
Total M&As in the previous four months	-0.001* (-1.758)	-0.001 (-1.566)	-0.001 (-1.240)	-0.000 (-0.467)	-0.000 (-0.346)	-0.000 (-0.182)
Ln(syndicate size)	0.435*** (11.119)	0.414*** (10.495)	0.416*** (10.741)	-0.043 (-0.925)	-0.051 (-1.082)	-0.044 (-0.890)
Fund type dummy	0.055 (0.690)	0.048 (0.597)	0.025 (0.328)	0.013 (0.151)	0.011 (0.126)	-0.015 (-0.158)
Relatedness	0.066 (1.462)	0.078* (1.729)	0.075 (1.643)	0.042 (0.832)	0.049 (0.980)	0.048 (0.920)
Industry and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	810	810	775	810	810	775
Adjusted R ²	0.15	0.15	0.15	0.01	0.01	0.01

Table 9

Regressions on IPO underpricing and offering size

The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. Variable definitions are provided in the Appendix. **, ***, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: IPO regressions	(1)	(2)	(3)	(1)	(2)	(3)
	Underpricing			Offering size		
Constant	0.420*** (3.167)	0.686*** (4.244)	0.539*** (3.823)	5.163*** (22.329)	5.339*** (21.311)	5.233*** (21.387)
VC age dummy	0.138** (2.391)			0.109 (1.585)		
Ln(VC age)		-0.061* (-1.894)			-0.038 (-0.969)	
VC previous IPOs			-0.014 (-0.817)			-0.015 (-0.541)
Prestige	-0.083* (-1.660)	-0.081 (-1.628)	-0.084 (-1.593)	-0.031 (-0.436)	-0.028 (-0.396)	-0.035 (-0.485)
Ln(IPO age)	-0.067* (-1.876)	-0.076** (-2.183)	-0.084** (-2.321)	-0.137*** (-2.587)	-0.145*** (-2.713)	-0.140*** (-2.596)
CRSP value-weighted return	-0.159 (-1.068)	-0.167 (-1.136)	-0.180 (-1.173)	-1.064*** (-5.466)	-1.073*** (-5.493)	-1.056*** (-5.274)
Total IPOs in the previous four months	0.002 (0.327)	-0.002 (-0.041)	0.003 (0.342)	-0.004*** (-9.487)	-0.004*** (-9.822)	-0.003*** (-8.821)
Ln(syndicate size)	0.032 (1.114)	0.024 (0.859)	0.029 (0.941)	0.008 (0.160)	0.002 (0.037)	-0.004 (-0.069)
Fraction of equity held by lead VC post-IPO	0.001 (0.740)	0.001 (0.677)	0.001 (0.716)	0.002 (0.564)	0.001 (0.518)	0.002 (0.503)
Fund type dummy	-0.035 (-0.540)	-0.053 (-0.786)	-0.037 (-0.545)	-0.062 (-0.740)	-0.073 (-0.859)	-0.061 (-0.701)
Industry and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	563	563	540	592	592	569
Adjusted R2	0.02	0.02	0.01	0.20	0.19	0.18

Panel B: M&A regressions	(1)	(2)	(3)	(4)	(5)	(6)
	Acquisition premium			Ln(deal value)		
Constant	0.031 (1.286)	-0.018 (-0.637)	-0.004 (-0.175)	2.497*** (6.771)	2.406*** (5.959)	2.334*** (6.246)
VC age dummy	-0.027** (-2.247)			-0.088 (-0.796)		
Ln(VC age)		0.013** (2.159)			0.012 (0.149)	
VC previous M&As			0.002 (0.734)			0.007 (0.163)
Ln(MA'age)	-0.004 (-0.758)	-0.003 (-0.649)	-0.001 (-0.200)	-0.103 (-1.365)	-0.102 (-1.327)	-0.073 (-0.962)
CRSP value-weighted return	-0.008 (-0.285)	-0.008 (-0.261)	-0.026 (-1.074)	0.028 (0.096)	0.032 (0.109)	-0.183 (-0.616)
Total M&As in the previous four months	-0.001 (-0.722)	-0.001 (-0.558)	-0.000 (-0.219)	0.001*** (5.611)	0.001*** (5.580)	0.001*** (5.908)
Relatedness	-0.010 (-1.374)	-0.010 (-1.268)	-0.009 (-1.128)	-0.011 (-0.103)	-0.013 (-0.124)	0.023 (0.204)
Ln(syndicate size)	-0.002 (-0.302)	-0.002 (-0.310)	0.001 (0.110)	0.156* (1.757)	0.168* (1.874)	0.131 (1.443)
Fund type dummy	-0.018*** (-2.626)	-0.018*** (-2.650)	-0.017** (-2.416)	0.144 (0.897)	0.144 (0.895)	0.101 (0.600)
Industry and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	593	593	568	810	810	775
Adjusted R2	0.01	0.05	0.03	0.04	0.04	0.04

Table 10

Logit analysis of IPO and M&A exits

The sample consists of 609 VC-backed companies taken public by IPOs and 824 VC-backed companies exit through acquisitions between 1995 and 2015. The dependent variable is a dummy variable which equals 1 if the private firm goes public and 0 if it is acquired. Independent variable definitions are provided in the Appendix. **, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)
Constant	-2.780*** (-8.532)	-1.601*** (-4.550)	-1.912*** (-6.349)
VC age dummy	1.210*** (9.723)		
Ln(VC age)		-0.154* (-1.881)	
Total previous IPOs and M&As			-0.002** (-2.484)
Ln(Firm age)	0.255*** (2.906)	0.197** (2.274)	0.191** (2.202)
CRSP value-weighted return	2.932*** (8.186)	2.906*** (8.442)	2.900*** (8.416)
Fund type dummy	-0.164 (-0.891)	-0.206 (-1.125)	-0.175 (-0.960)
VC investment stage	-0.537*** (-4.301)	-0.423*** (-3.557)	-0.451*** (-3.780)
Ln(syndicate size)	0.853*** (8.680)	0.748*** (7.795)	0.758*** (7.927)
Industry and year fixed effects	Yes	Yes	Yes
No. of observations	1,429	1,429	1,429
Adjusted R ²	0.13	0.08	0.08