Three essays on Venture Capital Post-IPO Involvement

Anup Basnet

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By: Anup Basnet

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Signed by the final examining committee:

_____ Chair
Dr. Mahesh Sharma

_____ External Examiner
Dr. Kainan Wang

_____ External to Program
Dr. Katharina Nieswandt

_____ Examiner
Dr. Maher Kooli

_____ Examiner
Dr. Frederick Davis

_____ Thesis Supervisor
Dr. Thomas Walker

Approved by _____
Dr. Cedric Lesage, Graduate Program Director

September 17, 2021 _____
Dr. Anne-Marie Croteau
Dean John Molson School of Business

ABSTRACT

Three Essays on Venture Capital Post-IPO Involvement

Anup Basnet, Ph.D.

Concordia University, 2021

Even though the VC literature acknowledges that VCs do not completely exit at the IPO and frequently stay invested long after an IPO, little attention has been paid towards how VCs exit post-IPO and how their exits affect the governance of their portfolio companies (PCs). We use a unique hand-collected VC ownership dataset derived from various SEC filings and examine VC exit patterns and how they relate to both the performance of their portfolio companies and to external governance mechanisms (e.g., litigation).

In the first essay, we examine how the ownership stakes of lead VCs evolve after their PCs are publicly listed. Lead VCs retain their holdings, on average, for three years post-IPO, and their primary exit mechanisms include share distributions (SDs), continuous sales in the open market (C Sales), and mergers and acquisitions (M&As). We find that the VC investment period before the IPO, the PC age before the IPO, and the percentage change in the post-IPO stock price all incentivize earlier VC exits and drive the choice of exit mechanism. Our results suggest that lead VCs remain invested longer when PCs are of better quality, when lead VCs have more experience in taking companies public, and when lead VCs hold positions in the companies' compensation committees.

In the second essay, we study whether VCs act opportunistically by exiting their PCs via an unfavorable merger. Employing a sample of 697 M&A offers for VC-backed IPO companies from 1996 to 2018, we find that takeover bids that occur in the presence of lead VCs command a higher initial premium and are less likely to be legally contested compared to bids for companies from which the lead VC has already exited. In addition, these companies enjoy higher stock price returns in response to the M&A announcement and muted price declines around the litigation date. We also document the importance of several lead VC characteristics in determining their portfolio companies' litigation risk.

In the third essay, we examine the influence of VCs' need to exit on post-IPO M&A activity. Using a sample of US VC-backed IPO companies from 1996 to 2014, we show that the presence of a lead VC indeed increases the probability of a portfolio company receiving a post-IPO takeover bid. However, to facilitate the merger, they do not influence the PC's management to avoid anti-takeover provisions. M&As that happen in the presence of lead VCs are completed faster and benefit the target shareholders by providing a higher takeover premium. Besides, acquirers of lead VC present companies do not suffer in terms of short or long-term market value.

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Chapter 1: Introduction

A typical venture capital (VC) fund has a life span of eight to twelve years, which starts after a deal is made between the VC firm and its limited partners (LPs). During the first three to five years of a VC fund, LPs fund VCs, and VCs invest in their PCs. PCs frequently obtain subsequent rounds of investments during the next five to seven years. This latter period typically also incorporates the growth of PCs and the potential exit of VCs. To exit from their investments, VCs may use IPOs, M&As, secondary sales, buybacks, and write-offs (MacIntosh, 1997; Cumming and MacIntosh, 2003b).

Even though IPO has long been considered as an exit strategy, most of the lead VCs do not exit at the IPO date. Barry et al. (1990) and Megginson and Weiss (1991) find that lead VCs continue to remain invested even after the IPO. These VCs may not sell the shares at the IPO to avoid sending any negative signals during the IPO process. Infact by remaining invested at the IPO, VCs certify their portfolio companies (PCs). If VCs do not divest at the IPO, then when and how do VCs exit? This question has received little attention in the finance literature. Identifying a gap in the literature, we analyze VC involvement after it takes a company public.

In the second chapter, we examine lead VCs' divestment process. We hand-collect VC ownership data from SEC filings and follow each lead VC in a public company until the ownership turns zero. We find that on average, lead VCs stay invested for three years post-IPO. VC characteristics such as fund life, age and IPO exit experience; PC characteristics such as age, quality and change in stock price; and board of director (BOD) characteristics such as VC holding a compensation committee affects the exit time. Post-IPO VCs can use sell shares in the open market (C Sales), distribute the shares to their LPs via share distribution (SDs), sell the entire PC to a strategic buyer (M&As), sell shares via secondary equity offerings, liquidate PC assets, sell shares back to the management or use a combination of these mechanisms. The first three mechanisms are the most preferred ones. We show that VC age, M&A experience, and change in stock price during the first 182 days of going public affects the choice of exit mechanisms.

In the third chapter, we examine whether the presence of lead VCs affects litigation risk. The presence of a VC can certify a merger, thereby leading to a lower probability of a merger facing merger-related lawsuits. Using a hand-collected lawsuit data from Securities Class Action Clearinghouse, SEC filings, Factiva and Lexis-Nexis, we show that the presence of lead VC indeed lowers the litigation risk. This lower risk can be the result of higher premium demanded by lead VC during the merger or the careful nature of VC while exiting via an M&A for the first time. In either case, the market reacts favorably during the merger.

In the fourth chapter, we examine whether VC choice of exit increases the probability of VC-backed IPOs to get acquired. Our results show that VCs are the behind the increased acquisition of VC-backed IPOs. However, they do not act opportunistically during their exit. First, they do not influence the PC to avoid using anti-takeover provisions during their presence. Second, they demand a higher premium from the acquirer, thereby creating value for themselves as well as other shareholders. Third, the acquirers of VC-present companies do not suffer in the long-run. Therefore, VC involvement post-IPO is favorable for all parties involved in the merger process.

In the fifth chapter, I provide some concluding remarks.

Chapter 2: VC ownership post-IPO: When, why, and how do VCs exit?

2.1 Introduction

Venture capital firms (VCs) invest in entrepreneurial companies and tend to exit successful investments either through initial public offerings (IPOs) or via acquisitions.[1] However, several studies document that VCs frequently retain a considerable portion of their shares in portfolio companies (PCs) that go public; i.e., VCs do not fully capitalize their returns on the IPO date (Megginson and Weiss, 1991; Lin and Smith, 1998; Krishnan, Ivanov, Masulis and Singh, 2011). If VCs do not sell their shares at the time of the IPO, then when and how do they divest their holdings in order to return the capital to their limited partners (LPs)? This important question has received little attention in the corporate finance literature and we attempt to address it here.

Although IPOs are a well-recognized exit mechanism, VCs cannot sell their shares at an IPO without repercussions. Outsiders may consider VC sales as a negative signal because of the adverse selection problem caused by the high information asymmetry between VCs (insiders) and outside investors and by the moral hazard problems caused by a misalignment of interests between exiting VCs and incoming shareholders. Such negative signals may ultimately result in a reduced IPO price and thereby hamper IPO companies' capacities to raise public funds. In addition to minimizing negative signals, VCs may try to certify PC quality by retaining shares at the IPO after incurring costs via underpricing (Allen and Faulhaber, 1989; Grinblatt and Hwang, 1989). Because VCs are repeat players in entrepreneurial finance, they generally avoid acting opportunistically. This argument is supported by the findings of Atanasov, Ivanov, and Litvak (2012) who show that VCs that act opportunistically and are eventually litigated raise less capital and invest in fewer future deals. There is therefore a disincentive for VCs to divest their shares at, or immediately after, the IPO.

VCs provide financial support as well as auxiliary support related to management, networking, marketing, product delivery, and strategy to entrepreneurial firms. PCs that continue to receive these services after the IPO have been shown to perform better in terms of profitability and/or stock performance than those that do not (Krishnan et al., 2011). However, this advantage may not be sustained if VCs do not manage their divestment process properly. For example, the sale of a large portion of the VC's holdings at the same time will create an unwanted downward pressure on the PC's stock prices. VCs need to balance the benefits of financial and auxiliary support with their need to divest as the PC matures. The VC exit choice is thus an important decision that, if managed properly, can be used to maximize value, maintain reputational capital for future investments, and mitigate price pressures. Recognizing the critical nature of this decision, we aim to answer the following research questions: (1) when and how do VCs exit after the IPO, and (2) what factors affect the timing of VCs' divestment and the choice of exit mechanism? To answer these questions, we hand-collect post-IPO VC ownership data from various proxy filings available on SEC EDGAR and then follow the lead VCs until their full exit. We focus on lead VCs given their primary role in monitoring and providing auxiliary services to their PCs.

Our study yields three main findings. First, we show that lead VCs, on average, stay invested for over three years post-IPO. We believe this is the first study to determine how long VCs take to completely divest from their PCs. Fürth and Rauch (2015) identify the exit time of

[1] To avoid confusion, we term VCs as firms and PCs as companies throughout the paper and do not use the terms interchangeably.

buyout funds, another type of private equity. VCs differ from buyouts funds in terms of their investment strategies as buyouts focus more on PC's revenue growth, invest on later stages, and prefer quicker exit compared to VCs who normally invest in the early stages and strive for continuous development of the PC. Second, we find that lead VCs predominantly use continuous sales in the open market (C Sales), share distributions (SDs) to their LPs, and M&As to divest their holdings post-IPO. Third, we find that VC characteristics such as its investment horizon, age, and experience, together with PC characteristics such as age, number of funding rounds, change in stock price, and membership in the board of directors, affect both the exit time and the choice of exit mechanisms.

Our findings contribute to the research literature in three distinct ways. First, our findings contribute to the existing VC literature that examines VCs' exit time. While other studies such as Macintosh (1997) and Cumming and MacIntosh (2003a, 2003b) treat IPO as an exit strategy in its own right, we show that lead VCs continue to hold substantial portion of their holdings post-IPO. Thus, we do not consider IPO as a full exit strategy but rather follow lead VC divestment process after the IPO until their complete exit. Second, we examine VCs' post-IPO divestment process using three major VC exit mechanisms. The extant literature investigates each exit strategy independently while we are the first study that investigate what determine VCs' decision of exit strategy and also consider all exits in aggregate as it allows us to examine how VCs prefer one choice over others. While examining the determinants, our findings also contribute to the existing literature that studies the finite lifespan of VC funds (Cumming et al., 2005; Kandel et al., 2011; Barrot, 2016) whereby we report that VC's investment horizon affects both the exit timing and choice of exit mechanism. Third, our study can potentially provide a useful procedural step to calculate valuation premium of IPO and acquisition. Bayar and Chemmanur (2012) employ a model in which they assume that VCs sell some shares at the IPO and the remaining shares three years afterwards to calculate premium via IPO exits. Because we observe that VCs sell shares regularly, we suggest considering insider transactions to calculate the long-run IPO valuation premium.

2.2 Background and related literature

MacIntosh (1997) explain VCs' five exit strategies. VCs exit via IPOs, M&As, secondary sales, buybacks, and write-offs. In an IPO, VCs can sell a significant portion of their investment in the entrepreneurial company either on the IPO date or within one year of going public. In an M&A, VCs sell the entire PC to an acquirer. In a secondary sale, VCs only sell their portion of the investment in the PC to an acquirer, i.e., the whole PC is not sold as is the case in a merger. A buyback occurs when VCs sell their shares to the founding entrepreneurs, and a write-off occurs when the entrepreneurial project is unsuccessful, and the firm is liquidated.

Several scholars have examined the choice of VCs' exit strategies. Giot and Schwienbacher (2007) use survival models to explain how VCs chose among IPOs, trade sales, and liquidations. The authors show that during the first 1000-1500 days of VC funding, VC-backed companies show a greater tendency of exiting via an IPO and that, as time progresses, non-divested companies show a lower tendency to go public compared to an acquisition. Cumming (2008) examines the importance of control rights on the decision to go public or to be acquired and confirms that when VCs have stronger control rights, they prefer to exit via an M&A compared to an IPO or a write-off. Bayar and Chemmanur (2011) theoretically verify Cumming's (2008) results and predict that the likelihood of an IPO is greater when the product market competition is low, the PC is in a less-concentrated industry, or the entrepreneurs prefer to retain control after the VC exit.

Among all exit strategies, perhaps IPOs have received more attention because of the availability of public company data and the salience of IPOs. Several factors affect the

probability of a private company going public in the presence of VCs. Gompers (1996) examines grandstanding in the VC industry and shows that young VCs take PCs public faster to enhance their reputation. In return, VC reputation also affects the success of an IPO, as reputable VCs are more capable of successfully placing an IPO (Nahata, 2008; Krishnan et al., 2011). Poulsen and Stegemoller (2008) show that PCs with higher growth opportunities and limited capital prefer to go public. Lerner (1994) show that seasoned VCs time the market while taking PCs public.

However, we cannot consider IPO as a full exit route. Barry et al. (1990), Megginson and Weiss (1991), Gompers and Lerner (1998), Lin and Smith (1998), and Krishnan et al. (2011) all provide evidence that VCs retain shares after an IPO. Barry et al. (1990) report that VCs hold a mean equity share of 24.6% immediately after the IPO and 17.8% one year after. Krishnan et al. (2011) report mean equity holdings of 8.05%, 7.70% and 6.62% in the first, second and third year after the IPO. Nevertheless, these studies do not track VCs until they fully divest. Two of the studies that track private equity until their exit are Fürth and Rauch (2015) and Jenkinson et al. (2020). Fürth and Rauch (2015) examine the exit strategies of buyout funds and show that, on average, buyout funds exit after 2.28 years post-IPO, and that PC characteristics and the success of the deal with the prospective buyer affect their exit timing. Jenkinson et al. (2020) report an exit time of around 3 years for buyout funds. We focus our study on venture capital, a different subset of private equity and not on buyout funds. We remove buyout firms from our sample because unlike VCs buyout firms invest in latter stage PCs capable of generating cash flows through restructuring, exit relatively quickly post-IPO, and rarely exert significant long-term influence on PCs[2]. We are the first to analyze the divestment process of venture capital firms post-IPO.

Similar to the five exit strategies as indicated previously, VCs employ various exit mechanisms to reduce their ownership stakes in PCs post-IPO. They can continuously sell their shares in the open market, distribute their shares to their limited partners via share distributions, sell a PC to another company in an M&A, sell shares via secondary equity offerings, liquidate the PC's assets, or use a combination of these mechanisms. C Sales, SDs, and M&As are the most used exit mechanisms.

Each of these exit mechanisms have their own merits. Using C Sales, VCs can sell their shares in the open market at different dates and at different prices. A clear example of C Sales is the case of RealPage Inc., in which Apax Partners (the lead VC) sold all of its holdings post-IPO at different dates. By breaking their divestments into smaller chunks, C Sales may help reduce the price impacts and the unintended signaling associated with VC sales. In addition, to mitigate the litigation risks related to insider trading, particularly in cases in which VCs have access to material information, VCs may also use trading plans according to Rule 10b5-1 of the Securities Exchange Act of 1934.

Divesting holdings through sales in the open market often takes a long time, and sometimes lead VCs do not have the necessary time to spread out their sales. For instance, they may be forced to divest faster as their partnership terms with LPs near expiration. An alternative to divesting via C sales is to distribute shares to LPs directly. An example of this approach is the case of New Enterprise Associates Inc (the lead VC) and Myogen Inc (the PC), in which the lead VC distributed shares during the third and fourth quarter of the year 2005, around two years after taking the PC public. Such distributions constitute a relatively easy and direct way by which VCs can return capital to LPs. Rather than deciding when to sell shares, get cash, and

[2] Please refer to Metrick and Yasuda (2011) and Buchner et al. (2019) for more details about VCs and buyout funds.

return the cash to LPs, general partners (GPs) can shift these decisions to LPs and collect the carried interest. By shifting the decision-making to LPs, GPs also provide flexibility to LPs on deciding when to sell the shares and manage their capital gain taxes. Furthermore, the transfer of ownership from GPs to LPs (with no related secondary market sales) should not imply downward pressure on the PC's stock price. Even if the stock price declines after SDs, the GPs' accounting return will be higher because they are able to distribute the shares at a higher price. This may be beneficial to the VC in the next round of fund-raising.

Another way to divest is via M&As. Here, VCs can retain some or all of their shares at the IPO and influence the management of the PC to sell the company to an acquirer at a later date. An example of this approach is the case of Domain Associates (the lead VC) and Therapeutics Inc. (the PC), in which Domain Associates sold all the outstanding shares held at the time of the IPO (July 19, 2012) via a strategic sale of the PC to Actavis W.C. Holdings (the acquiring company) on November 28, 2014. The typical premium found in M&A transactions provides advantages for VCs, LPs, and the PC. VCs can divest their holdings at a price premium relative to the pre-acquisition price, LPs typically receive their committed capital back at once in the form of a lump sum payment rather than in fragments from continuous sales or share distributions, and the PC is valued at a premium.

Previous literature has examined many of these exit strategies separately. Gompers and Lerner (1998) find that, on average, share distributions occur twenty months after an IPO and that the market continues to react negatively to share distributions for months following these distributions. Bradley et al. (2001) and Field and Hanka (2001) examine VC sales following the lockup and find that the large sales after the lockup expiry put undue pressure in the stock market. Brau, Sutton and Hatch (2010) and Gill and Walz (2016) examine the post-IPO mergers of VC-backed IPO companies but they do not explicitly relate the mergers to VC exit. In this paper, we examine the mechanisms together and identify factors that affect the choice of exit mechanism.

2.3 Data and descriptive statistics

2.3.1 Data sample

We collect information on all US VC-backed IPOs from 2003 to 2014 from the Thompson Reuters SDC VentureXpert database. VentureXpert lists 612 VC-backed IPOs during this period. We remove any IPO companies with (a) an IPO price below $5, (b) IPO proceeds of less than $5 million, (c) multiple share classes at the IPO, and (d) companies that operate in the financial, insurance, or real estate industries. Next, we hand collect lead VC ownership data from different SEC filings and remove any IPO companies for which these data are missing. These filters decrease our sample size to 462 companies. Next, we gather VC and PC characteristics from the SDC Platinum Global Issues, SDC Platinum VentureXpert, and Compustat databases, together with additional IPO- and M&A-related variables from FactSet, and stock return data from the CRSP database. After merging all databases and eliminating companies with incomplete records, our final sample includes 403 IPO companies.

2.3.2 Variable definitions

We define lead VCs using the following criteria:

1. A lead VC must have the highest amount invested according to the SDC variable "Firms Total Known Amount Invested." In some cases, when VCs also invest after the IPO, we check the VC ownership percentage at the IPO and determine whether the lead VC defined by the above criteria also has the highest ownership immediately before the IPO.

2. If two or more VCs have an equally high amount invested, we choose the VC with a greater stock ownership in the company's S-1 filing.[3]

3. If two or more VCs have an equally high amount invested per the SDC variable and the equal ownership in the company's S-1 filing, we choose the VC that holds a directorship. If all VCs hold a directorship position, then we choose the VC with the greater number of directorships.

2.3.3 Dependent variables

To examine post-IPO divestment process of lead VCs, we use VC ownership, exit time and exit mechanisms as the dependent variables. We define *lead VC ownership post-IPO* as the fraction of outstanding shares held by a lead VC post-IPO data on a quarterly basis at the finest level and annually at the broadest level. We manually collect ownership data from IPO prospectuses, DEF proxy filings, schedules 13G/D, and Form 4 filings publicly available on SEC EDGAR.[4] We follow all lead VC-backed IPOs from the IPO date to three years after the last available VC ownership date or the last available proxy filing. We exclude any lead VC ownership before the IPO to avoid any share dilution during the IPO process. We ensure that VC ownership data is collected to the lowest percentage level available (well below the blockholder ownership of 5%) by carefully adjusting to any comments provided in the filings, and by checking insider trading information (particularly Form 4) available on SEC EDGAR.[5]

The variable *exit time* reflects the number of years a lead VC retains its shares post-IPO. We identify the exit date of a lead VC using VC ownership data, supplemented by insider trading and SC 13G/D filings. We seek the exact date when a lead VC sells its last remaining holdings post-IPO using Form 4. If we are unable to acquire this information from Form 4, we treat the exit date as the first date when the VC ownership is zero, as is available in forms DEF 14, DEFM 14, and SC 13G/D.[6] Finally, if we cannot determine the exit date via the above process, we conservatively adopt the last known ownership date+365 days as the exit date.[7] During this process, if a PC merges or is acquired, we obtain the date when the VC sells its shares during the merger. This date is often available in Form 4. If not, we use the CRSP delisting date (with CRSP delisting codes ranging from 200 to 290). Further, we exclude any PCs that are delisted because of insufficient capital, bankruptcy, non-payment of fees, or a failure to meet the financial guidelines for a continued listing in an exchange (CRSP delisting

[3] We opt for ownership before the offering rather than after the offering to avoid any share dilution due to new shares offered or any VC share sales.

[4] We collect most of the data from the listed filings. However, some of the data are also available in S-3, 424B3, 424B4, 424B5, 10-K, SB-2, DEFM 14, DEFR 14, and SB-23 filings.

[5] We web scrape SEC EDGAR insider filings (Forms 3, 4, and 5) to obtain relevant data on the lead VC's insider trading. We exclude any derivative securities acquired or disposed by the lead VC and only focus on common stock. Sometimes lead VCs do not file the forms under their own name/s but via their manager. We retrieve the names of these managers from SC 13G/D/A filings and use these names to web scrape insider trading data. We manually check each transaction of this type to ensure that the transactions are by the lead VC and not by the manager. Furthermore, we check all lead VC transactions to make sure that we include transactions of all VC funds, as identified via SDC data, S-1 filings, and DEF 14 filings.

[6] We begin by hand collecting VC ownership data from DEF 14 and SC 13G/D filings to determine the exit date. If we cannot determine the exit date from these filings, we scrape the SEC EDGAR website for any filings that contain the lead VC name (sometimes the VC fund name when appropriate) and use them to determine the exit date. This web scraping process helps us determine secondary public offerings (an exit mechanism) via S-1, S-3, 424B3, 424B4, 424B5 filings, apart from the exit date.

[7] Our results are qualitatively similar under the exit assumption of 180 days after the last known ownership date.

codes 400-490) or have VC holdings until 2019 while determining the exit date.[8] We do not know when and how VCs exit from delisted companies. These companies are only dropped from the exchange but may continue their business operations.

Exit mechanisms are the pathways that lead VCs take to divest their holdings from their PCs post-IPO. We focus on SDs, C Sales, and M&A transactions as these are the most frequently used exit mechanisms. If a lead VC divests most of its shares (more than 50% of the shares held at the IPO) through continuous sales in the open market, we create a dummy variable that equals one for *majority C Sales*.[9] We do the same for SDs and M&A and call them *majority SDs* and *majority M&A* respectively. We check Form 4 and SC 13G/D to determine how VCs divest.[10] The comment section "Explanation of Responses" or "Remarks" in Form 4 normally discloses SDs, C Sales, M&As, and public offerings. Insider trading by small VCs, those that do not hold insider positions or those that are not 10% blockholders may not report their trades to the SEC. Since our sample focuses on lead VCs, which hold on average 16.1% of outstanding shares at the IPO in our sample, most of the insider trading data is available on the SEC website. If we cannot determine exit mechanisms from Form 4 or SC 13G/D, we web scrape SEC EDGAR for any filings mentioning the name of the lead VC or lead VC funds and manually check these filings to collect any additional information. Some of the filings that have additional data for exit mechanisms are S-3, S-1, and 424B3. We further supplement this data with CRSP delisting codes such as codes 200-290 (mergers), 400-409 (liquidation) and 500-591 (dropped). Whenever possible, we also search Factiva to determine the exit mechanisms.

2.3.4 Independent variables

We examine the influence of the lead VC's investment period, the lead VC's age, the PC's age, the lead VC's experience, VC monitoring, and PC performance on lead VC's exit time and exit mechanism. The *investment period before the IPO* is the time (in years) over which lead VC holds its investment in the PC before the IPO. We measure this period from the day on which the lead VC make its first investment in the PC to the IPO date. This variable represents the total investment period of a lead VC and excludes the fund-raising period and divestment period after the IPO. *Lead VC age before the IPO* is the age of a lead VC firm on the IPO date of its PC. We measure this variable as the difference between the lead VC founding date or January 1, 1980, whichever is later, and the IPO date. We use January 1, 1980, as the starting period of VCs established before 1980 because this date is often considered as the start of the modern VC era (Gompers & Lerner, 1999; Rin et al., 2013). The "prudent man rule" under the Employment Retirement Income Security Act (ERISA) of the US Department of Labor was relaxed in 1979, allowing pension funds to invest in VCs. This rule relaxation significantly increased the supply of commitments to VC funds. *PC age before the IPO* is the age of the portfolio company on the IPO date and is calculated as the difference between the PC founding date and its IPO date. The *no. of previous IPOs by the lead VC* is the number of previous IPO exits by a lead VC. We count all companies with a VC investment according to the SDC variable "Firms Invested in Company" before the IPO of the invested PC starting from January 1, 1980. This variable represents the experience of a lead VC in taking private companies public and their involvement after the IPO. The *no. of previous M&As by the lead VC* is the number of previous M&A exits by a particular lead VC. This is a similar measure to

[8] We use the most recent filings to determine whether lead VCs hold shares until May 2019. If lead VCs hold shares until the end of 2018 or the beginning of 2019, we consider them as still active in these PCs.

[9] Although 50% is used to define majority, in most cases more than 70% of the shares are divested using a particular exit mechanism.

[10] One can access Form 4 of any company through the 'insider transactions of this issuer' section on the SEC's website. For instance, the Form 4 filings of 'Pacific Biosciences of California Inc.' is available at https://www.sec.gov/cgi-bin/own-disp?action=getissuer&CIK=0001299130.

the *no. of previous IPOs by the lead VC* but differs in that it focuses on sellouts to other companies instead of IPOs. We collect the underlying information from FactSet by searching for each individual VC, downloading all exits, and counting the number of previous sellouts to either public or private buyers. The *no. of rounds received by the company* is the total number of financing rounds received by a PC from all VCs, while the *% change in stock price: IPO to IPO+182 days* proxies for the change in the stock price during the lockup period. The variables *lead VC in the audit, compensation,* and *governance committee* are three dummy variables that take on a value of one when a lead VC holds a position in those committees, and zero otherwise. In addition, we measure the PC's accounting performance as *ROA* and *ROE*, its stock price performance as the firm's *average return,* and its *excess return relative to the S&P 500*.

We winsorize the characteristic variables for the lead VC and the PC at the 1st and 99th percentile to remove outlier effects. We provide definitions of all independent and control variables in Appendix 1.

2.3.5 Summary statistics

Panel A of Table 1 shows that, on average, lead VCs stay invested for 3.04 years (approximately 36 months) post-IPO. The median post-IPO horizon is 2.53 years with a minimum of 0.24 years and a maximum of 11.46 years indicating significant right skewness.[11] The remaining rows of Panel A provide additional characteristics that describe the exit time decision. We begin with a brief discussion of some related (untabulated, for brevity) VC governance characteristics. Over 85% of lead VCs in our sample hold an insider (executive or director) position at the time of the IPO. Moreover, lead VCs often hold important positions on the board of directors (BOD) including participation in the audit (35.2%), compensation (58.9%), and governance (42.83%) committees.[12]

[Insert Table 1 About Here]

Per the second row of Panel A, on average, companies went public 5.83 years after the first round of investments by a lead VC. The average (median) *lead VC age before the IPO* and the *PC age before the IPO* are 20 (19.24) and 9.15 (7.96) years, respectively. Lin and Smith (1998) show that the average VC age before the IPO between 1979 and 1990 is 12.6 years. The VC industry has matured since 1990, leading to the increase in average VC age that we observe. Lee and Wahal (2004) and Krishnan et al. (2011) find the mean PC age at the IPO to be around 7.68 and 7 years, respectively. On average, PCs are more mature in our sample (9.15 years on average). Our PCs take slightly longer to go public and have a larger mean IPO size of $88.52 million compared to Krishnan et al.'s (2011) $58.11 million (with a substantial part of the increase attributable to inflation). Most of the stock price change during the first year of going public is concentrated during the lockup period. The mean (median) percentage change in the firm's stock price from the IPO to 182 days after the IPO, excluding underpricing, is 21.79% (12.33%) whereas the price change from 182 days to 365 days post-IPO is just 1.45% (-6.70%).

Panel B reports lead VC ownership characteristics for use in our subsequent regressions, and Panel C reports aggregate lead VC ownership characteristics in post-IPO relative time. On average, lead VC holds 21.28% of the outstanding PC's shares pre-IPO and 16.08% immediately after the IPO. Our results are comparable with and build upon Barry et al. (1990)

[11] We have a minimum exit time of 0.24 years because Medimmune Ventures did not sell any shares in Xenor Inc.'s IPO on December 3, 2013, but the next DEF 14A filing on February 28, 2014, does not include any ownership data of Medimmune Ventures. Thus, we consider Medimmune to have sold shares within three months of going public.

[12] Lead VC activity appears less focused on day-to-day management with only 6.3% holding an executive position and only 3 out of 462 lead VCs holding both executive and director positions.

and Lin and Smith (1998), who find that lead VCs hold 19.1% (17.3%) of the outstanding shares before the IPO and 13.6% (12.1%) immediately after the IPO. Furthermore, we observe that the median ownership of approximately 20% pre-IPO falls to 15% immediately after the IPO, largely due to dilution through the IPO process. Subsequently, we observe a 36% reduction in median lead VC ownership in the next year (from 15 to 9.62%) with further annual reductions of 14% in each of the next two years. From the initial post-IPO reduction until five years later we see a 65% reduction in median lead VC ownership. We also observe substantial variability across lead VC ownership for all rows of Panel C, typically of approximately 10%. Although we see a large reduction in ownership around the IPO and subsequent initial post-IPO years for the PC, there remains substantial lead VC ownership even after five years. These results demonstrate a compelling aggregate dynamic in lead VC ownership changes over time from partial exit at IPO through the subsequent post-IPO exit decision.

Figure 1 summarizes mean (solid line) and median (dashed line) lead VC ownership in the post-IPO period for relative years 0 (immediately after the IPO) through 11. We observe a continuous decline in VC ownership over the years. However, in year 8, the line graph slopes upward because the remaining 17 VC firms in year 8 have increased ownership (on average) even when compared to the expanded set of 28 VC firms in year 7.

[Insert Figure 1 About Here]

In Table 2, we include the number of PCs using each exit mechanism and provide information regarding the mean (median) exit time and investment period before the IPO for each exit mechanism. 67 lead VCs divest most of their shares via C Sales, 109 via SDs, and 64 via M&As. Some of the PCs are delisted (18) while others undergo an SEO (10). 38 lead VCs had not exited by 2019, thus termed no exit. Considering that we do not find insider trading data for the 127 lead VCs, we cannot determine their exit mechanisms and thus are forced to term them "unknown" in the table.

[Insert Table 2 About Here]

We focus our analysis on majority C Sales, SDs, and M&A following the higher number of VC exit mechanisms in our data and the ease with which we can hand collect data for these mechanisms.[13] Table 3 shows that majority SDs constitute the shortest exit route for lead VCs, with 2.92 years, while majority C Sales represent the longest of the three major exit mechanisms at 3.64 years. The mean difference between C Sales and SDs is significant. VCs can distribute large proportions of their shares to LPs at once via SDs. These distributions are not considered sales and are thus exempt from any anti-fraud or anti-manipulation rules by the SEC. In addition, VCs do not need to disclose these distributions to the SEC under Rule 16(a)-7 of the Securities Exchange Act of 1934. As a result, this mechanism is a much faster and easier divestment process than the other exit mechanisms.

[Insert Table 3 About Here]

2.4 Empirical analysis

The decision to sell shares post-IPO can be static (the decision is made at the IPO) or dynamic (the decision is made as factors/variables affecting the decision change over time). To accommodate the understanding of both types of decision-making process, we refer to the effect of pre-IPO static variables in Section 5.1 and time varying average return variable in

[13] We could not collect all divestment dates and the associated exit mechanisms of all lead VCs and thus cannot analyze all the exit mechanisms. Smaller sales in the open market and lead VCs' divestment plans are not publicly disclosed.

Section 5.2. Additionally, in Section 5.3, we examine the determinants of the lead VC's preferred exit mechanism.

2.4.1 Exit time

We measure the impact of VC, PC, IPO, and BOD characteristics on the exit time variable. We run industry-fixed-effects regressions in Models 1, 2, 3, and 4 of Table 4 using the Fama and French 48-industry classification. In Model 1, we introduce VC characteristics, followed by PC/IPO characteristics in Model 2 and board characteristics in Model 3. We include all independent variables in Model 4.[14] Finally, in Model 5, we estimate a survival model (Weibull parametric accelerated failure time)[15] regression to examine how fast lead VCs exit post-IPO. We choose the distribution for failure time using the Akaike Information Criterion (AIC)/log pseudolikelihood criteria.[16]

[Insert Table 4 About Here]

Herein, we explain the reasons for inclusion of our control variables. If VCs invest more in PCs, they may require more time to divest. As some VCs may sell shares before the IPO, we control for both the *lead VC ownership at the IPO* and the *lead VC's total known investment*. If lead VCs prefer to invest late with more divestment time post-IPO, or with a greater number of VC firms in the syndicate, they can stay longer post-IPO. Further, if PCs operate in high-tech industries with more information asymmetry, lead VCs are again more likely to stay longer post-IPO. Firms with higher IPO proceeds (*IPO size*) are likely better covered both by analysts and the media, which may reduce information asymmetry between the PC and outside investors. With less information asymmetry, lead VCs are more likely to exit faster without sending a negative signal to other market participants. Furthermore, if there are blockholders other than the VC at the IPO, lead VCs can exit faster because monitoring can be shifted to other blockholders. Similarly, if lead VCs get a higher return from the IPO itself, they may prefer to sell shares at the IPO or exit sooner.

Our results show that the *investment period before the IPO* has a significant (1% level) negative impact in all fixed-effects regressions. This result is consistent with a finite limit to VC investment horizons in PCs.[17] A typical VC fund has a life span of 8 to 12 years consisting of fund-raising, investment, and divestment periods. Even though VCs may extend the partnership agreement term one- or two-times post-IPO for a period of one to two years, the total term is often quite rigid, and VCs must eventually liquidate the fund to distribute capital to their LPs. The constraint on fund life thus impacts the divestment period. The *lead VC age before the IPO* has a negative association with exit time in Models 1 and 4. Older VCs have more readily available public information and are able to reduce information asymmetry

[14] In unreported tests, we calculated the correlation coefficients for all independent variables used in our regressions. The results, available upon request, raised no concerns regarding possible multicollinearity and are excluded for brevity.

[15] One of the most popular models in survival analysis is the proportional hazard model. This model assumes constant proportional hazards for all covariates, which is a strong assumption and easy to fail with many covariates. We first test the proportionality assumption for the hazard model using the Schoenfeld residuals (Schoenfeld, 1982; Grambsch and Therneau, 1994). Some of our important covariates fail to fulfil the proportionality assumption. Furthermore, constant hazard implies that an exit in year 1 is as equally likely as an exit in year 2 or 3. This may not be true in the case of VCs whose finite life forces them to sell more shares early, after the lockup, or during the first year, as is also evident in our summary statistics in Table 1. Therefore, we do not use a proportional hazard model.

[16] The use of the Weibull distribution is also theoretically justified because this distribution allows for monotonically decreasing functions such as the decreasing VC ownership post-IPO.

[17] For example, Kingsbury Associates invested for a period of 9 years before the IPO of Digirad Corporation and was forced to make a liquidating distribution to its partners within 2.5 years of going public.

between insiders and the diffused investors of a public company. Thus, they can afford to divest faster. In addition, young VCs may struggle to raise subsequent funds. Therefore, they may wish to get more from the same investment and stay longer to capture any value-added opportunities after the IPO. Moreover, if young VC firms do indeed bring PCs public earlier per Gompers (1996), then they have more time left in their investment cycle and thus can retain shares longer. The *no. of previous IPOs by the lead VC* is significant and positive in our fixed-effects regressions. Lead VCs with more prior experience in taking companies public hold on to their shares for a longer time (Models 1 and 4) and exit more slowly (Model 5). Lead VCs with more experience understand the difficult transition process from a private to a public company, and thus may stay with the entrepreneur or the management to assist in this transition and manage a public company afterwards.

The variable *PC age before the IPO* is significantly negative in Model 2. Because young PCs are riskier and may have a higher probability of failure than older PCs, VCs appear to stay longer post-IPO in the case of younger PCs to provide additional monitoring and support. Furthermore, because young companies have higher growth potential, VCs may prefer to remain invested for a longer period, until they are forced to exit. They may also retain their positions for a longer time in better quality companies as indicated by the variable *no. of rounds received by the company*. In addition, the *% change in the stock price from the IPO to IPO+182-days* variable is significantly negative at the 1% level in Models 2 and 4. VCs cannot sell their shares during the lockup period and can only divest at the IPO or after the lockup period expiration. Bradley et al. (2001) show high trading volume at the lockup expiration, particularly for VC-backed IPO firms. If stock price increases significantly during the lockup period, VCs may prefer to sell their shares after the lockup expiry, leading to a shorter time until exit.

In addition, lead VC experience in dealing with IPOs shows a significant association with exit time. Krishnan et al. (2011) show that reputable VCs hold on to their directorship positions for a longer time post-IPO. If VCs hold positions in the *compensation committee at the IPO*, they can directly influence payments to themselves and indirectly affect stock price movements via stock options to executives. Likely a consequence of lead VCs' having more influence and control rights, they appear to stay longer, i.e., they exit more slowly post-IPO (as indicated by the negative coefficient in Model 5).

Among the control variables, *lead VC ownership at the IPO* and *blockholder ownership at the IPO other than VC* positively affect exit time. As expected, lead VCs holding a greater number of shares at the IPO retain shares longer post-IPO. We expect lead VCs to exit faster in the presence of other blockholders at the IPO because other blockholders can replace VC monitoring. However, the *other blockholder ownership at the IPO* variable significantly negatively affects the speed of exit. This could be because lead VCs want to stay invested for a longer period in better-quality companies, whereby a higher percentage ownership of other blockholders indicates a higher-quality company. Furthermore, if a PC performs well in the secondary market (i.e., the IPO is underpriced), lead VCs appear to prefer a faster exit. A possible explanation for this phenomenon may be that the lead VCs try to capture the increased share price opportunity to cash out of their investments.

2.4.2 Percentage ownership

To enhance our understanding how VCs decide on exit timing, we exploit a panel setting and study how company characteristics determine VC ownership over time. Because our dependent variable, *lead VC ownership post-IPO*, is a fraction between 0 and 1, we adopt the methodology of Papke and Wooldridge (1996) in Table 5 and estimate a fractional logit firm-fixed-effects regression to describe lead VC ownership post-IPO as a function of company

performance variables such as ROA (Model 1), ROE (Model 2), average return (Model 3), and the excess market return (Model 4).

We control for *lagged VC ownership*, *firm size*, *cash*, *leverage*, *net sales*, *capital expenditures*, the market-to-book ratio (*MTB*), and *intangible assets*. If VCs hold many shares in the previous quarter, then they are more likely to hold many shares in the then-current quarter. Demsetz and Lehn (1985) and Clifford and Lindsey (2016) find an inverse relation between insider ownership and *firm size*. Jensen (1986) demonstrates that PCs with more *cash* may have more severe agency problems between managers and shareholders. VCs may wish to monitor these firms more intensely and thus hold more shares. Another way of reducing agency problems and curtailing overinvestment in newly public firms is to take on more debt. More *leverage* forces management to invest in good projects that will generate enough cash to pay back interest and loans. Therefore, more leverage can act as an internal monitoring mechanism, reducing the reliance on external monitoring from VCs, and allowing VCs to divest their holdings. Furthermore, by increasing their leverage, firms can signal that they are of high quality, which should increase the market's valuation of the company (Ross, 1977). VCs may utilize this situation (increased share price) to divest their holdings. Finally, VCs may wish to stay longer and hold on to their shares when their PCs are doing well in terms of *sales,* or if they invest more in the future of the PC via long-term *capital expenditures.* However, VCs may wish to divest their shares and realize higher returns in line with an increasing *MTB* ratio. In addition, we control for the effect of *intangible assets* such as patents, brand value, and trademarks on ownership. Since these assets are difficult to value and create information asymmetries between insiders and outsiders, VCs may retain their shares to signal good prospects of the company.

[Insert Table 5 About Here]

We find that *ROA* is significantly positively related to post-IPO lead VC ownership at the 1% level, suggesting fewer sales in profitable and fundamentally strong PCs. This finding is consistent with lead VCs staying longer in quality PCs, especially when information asymmetry is substantial. We do not find a significant relation between lead VC ownership and *ROE*. However, the *average return* variable is significantly negative at the 1% level in Model 3, which shows that lead VCs retain fewer shares when the average return is higher. To examine whether lead VC's divestment process is also influenced by lead VCs' trying to time the market, we include the S&P500 return in the same model. The *average S&P500 return* is insignificant. Furthermore, the *excess S&P500 return* variable is significantly negative in Model 4 consistent with the *average return*. Krishnan et al. (2011) show that PCs with post-IPO VC involvement perform better in the three years following the IPO. We extend their logic and argue that lead VCs first help improve a PC's performance, and following the PC's improvement market performance, lead VCs decide to divest their holdings. VC involvement post-IPO benefits both parties.

As for the control variables, *lagged VC ownership*, *cash*, and *capital expenditures* are significantly positively related with lead VC ownership. In contrast, *firm size*, *sales*, and *MTB* exhibit a significantly negative relation with lead VC ownership as expected.

2.4.3 Exit mechanisms

In this section, we focus on how lead VCs divest most of their shares post-IPO via C Sales, SDs, and M&As. In Table 6, we present binomial (Models 1, 2, and 3) and multinomial (Model 4) logit regressions to predict the chosen exit mechanism. We use binomial logit regressions to identify the VC-, PC-, and IPO-related factors affecting the lead VCs' decision to choose one mechanism over all others, and multinomial regression to understand the decision to choose

SDs or M&A over C Sales. Lead VCs divest a fraction of their holdings at the lockup expiry via C Sales (Bradley et al., 2001; Field and Hanka, 2001) and then decide on whether to continue with C Sales or change to SDs or M&A. To accommodate this choice pattern, we treat C Sales as the base variable in our multinomial logit regression.

We control for *lead VC ownership at the IPO*, a *high-tech dummy*, the *number of VCs invested in the company*, *IPO size*, *blockholder ownership at the IPO*, and an *IPO multiplier* in the logit regressions. VCs holding more shares at the IPO use multiple exit mechanisms to divest their holdings. PCs in tech industries have more information asymmetry between VCs and LPs. Thus, in such cases, LPs may prefer not to receive shares from VCs but rather the proceeds of share sales. Investments from a greater number of VCs in a syndicate signal a better-quality company. For these PCs, LPs may wish to receive shares, rather than the proceeds from share sales or M&As. PCs with higher IPO proceeds or more blockholders at the IPO excluding the VCs have favorable investor perceptions or are thought to be properly governed, which makes it easier for their VCs to sell shares in the open market. Furthermore, if the VCs' investment grows considerably at the IPO (the IPO multiplier is high), VCs may prefer to time the market and sell the shares or even distribute the shares to LPs as explained by Gompers and Lerner (1998). In a similar vein, VCs may prefer to use C Sales when there is greater underpricing.

[Insert Table 6 About Here]

Our results show that the VC investment life cycle affects the choice of exit mechanisms. The variable *investment period before the IPO* is significantly negative at the 1% level in the C Sales logit regression in Model 1, significantly positive at the 5% level in the SDs logit regression in Model 2, and insignificant in the M&A logit regression in Model 3. If lead VCs take more time to take PCs public, they will prefer SDs over other exit mechanisms, and other exit mechanisms over C Sales. In Table 4, we concluded that lead VCs with a longer investment phase before the IPO exit faster. As SDs are a much faster exit route compared to other mechanisms, these lead VCs prefer SDs. VCs can avoid the entire process of deciding when and how to divest their holdings (i.e., establish a sales plan per Rule 10b5-1) and return the proceeds to LPs, which essentially helps them exit faster at a time when there are few years left in the divestment period. A similar preference for SDs is also evident in our multinomial logit regression in Model 4, which indicates that lead VCs prefer SDs over C Sales. SDs allow lead VCs to distribute a large number of shares quickly without inflicting unwanted downward pressure on the stock market unlike a large sale in the open market.

The *lead VC age before the IPO* is significantly positive in Model 1 and significantly negative in Models 3 and 4, suggesting that older lead VCs prefer C Sales over M&As. This is likely because older lead VCs are better at reducing information asymmetries between insiders and outside investors at the IPO, thereby helping older VCs to divest their holdings in the open market via C Sales. Furthermore, the *no. of previous M&As by the lead VC* significantly positively affects the probability of a lead VC exiting via an M&A, indicating that lead VCs prefer to use the exit mechanism with which they are more familiar. The *no. of previous IPOs by the lead VC* does not influence the decision as strongly as do previous M&As. However, Model 1 shows that lead VCs with prior IPO exit experience are less inclined to use C Sales.

The variable *PC age before the IPO* is negatively associated with the VC's likelihood of using SDs. LPs may wish to receive shares of younger companies with higher growth potential in the hope of selling those shares at a higher price in the future. Following the same logic, lead VCs appear to prefer selling the shares of older PCs in the open market or via a merger, which may be explained by the PCs' limited growth potential. The *no. of rounds received by the company* is significantly negatively related to SDs (at the 5% significance level) in Model 2

but is insignificant in other regressions. We expected this relation to be positive as LPs arguably prefer to receive shares in better-quality companies. We cannot confirm whether lead VCs prefer a particular exit mechanism as the coefficients in Models 1, 3, and 4 are insignificant. However, the negative coefficient in Model 2 indicates that lead VCs prefer not to use SDs in PCs that receive more rounds of funding. Lead VCs investing in such companies may wish to stay longer as indicated by the same variable in Table 4 and to do so, VCs avoid SD. In addition, the *% change in stock price from the IPO to IPO+182-days* variable is significantly positively related to C Sales in Model 1. It is logical to sell shares in the open market if good value is securable there, but if stock prices change little during the lockup period, lead VCs may prefer to sell the whole company via a merger (explaining the negative coefficient in Model 4) as this route may help the lead VCs get a higher return.

Among the control variables, *lead VC ownership at the IPO* is significantly positively related to SDs and M&A. With SDs or M&A, VCs can sell the bulk of their shares at once, which is not possible with C Sales.

2.4.4 Robustness tests

Per Table 1, since our dependent variables (*lead VC exit time* and *ownership percentage*) exhibit a large dispersion, we estimate a series of quantile regressions (i.e., at the 25th, 50th, and 75th quantile) in Table 7 as a robustness check.[18] Panel A of Table 7 shows that most of our exit time independent variables are significant at similar levels as before. In Panel B, the variable *average return* is still significantly negative at the 1% level. The variable *average S&P500 return* loses its significance in the 50th quantile regression but retains its significance in the 25th and 75th quantile regressions. Lead VCs appear to be more likely to follow the market index to divest their holdings when their ownership approaches extreme.

[Insert Table 7 About Here]

2.5 Conclusions

The extant finance literature acknowledges that VCs do not completely divest at the IPO stage (Barry et al., 1990; Megginson and Weiss, 1991; Lin and Smith, 1998; Krishnan et al., 2011). Yet, we are neither aware of how nor when these VCs exit post-IPO. Because VCs provide financial and auxiliary support services to entrepreneurial firms, it is essential to understand until when the PCs continue to receive these support services. To this end, we manually collect VC ownership data for a comprehensive sample of US VC-backed IPO companies from 2003 to 2014 and follow the lead VCs until their complete exit. We find that, on average, lead VCs retain their shares for a period of more than three years after the IPO. VC characteristics such as investment cycle, age, and experience; PC characteristics such as age, the number of funding rounds, and the change in stock price; and board characteristics such as a position on the compensation committee at the IPO all affect the speed of the lead VCs' exit post-IPO. VCs with longer investment periods are forced to exit faster while older VCs and VCs that invest in older PCs can afford to exit faster, perhaps because of less information asymmetry between them and PC investors. These VCs also tend to stay longer when PCs are of better quality as indicated by a greater number of financing rounds, when they have more experience in taking companies public, and when they hold important board positions.

[18] In another robustness test, we run the exit time, VC ownership, and exit mechanism regressions after removing the IPOs during the financial crisis period from December 2007 and June 2009. The findings are similar to our main results and are excluded here for brevity.

We further examine how lead VCs divest their shares. Although VCs can use several exit mechanisms such as sales in the open market, share distributions to their LPs, strategic sellouts, SEOs, management buyouts, or a liquidation of the PC's assets, we observe that the first three exit routes are by far the most popular. Lead VCs that spend more of their total fund's life during the investment phase before the IPO prefer SDs to C Sales. Older lead VCs prefer C Sales to M&A transactions, while for younger PCs, SDs constitute the preferred exit mechanism. Lead VCs with prior M&A exit experience prefer to exit via M&As even after the IPO. An increase in a company's stock price during the lockup period leads to an increased likelihood of using C Sales.

By providing detailed insights regarding lead VCs' exit timing, exit mechanisms, and the factors affecting these processes, our study offers essential information to entrepreneurs, VCs, and LPs. If entrepreneurs know ex-ante that VCs do not divest immediately after the IPO, they can choose more easily among different funding means such as bank loans versus venture capital (Winton and Yerramilli, 2008). In addition, by exiting from a PC, VCs generally free up resources and can more easily start their next investment cycle. Indirectly, VC exit timing represents the start of a new fund, which is often a great time for new entrepreneurs to pitch their ideas to these VCs. Further, on observing lead VC's preference to stay invested after the IPO, smaller VCs may plan to hold on to a part of their investment after the IPO and try to capture any value-added opportunity associated with staying post-IPO. Finally, knowledge about VCs' exit timing and the dynamic changes in preferred exit mechanisms over time may help LPs be aware of when and how they will receive their invested capital back.

Chapter 3: The effect of lead VC presence on the probability and outcome of merger-related litigation

3.1 Introduction

Previous studies show that VC-backed IPO companies have a higher probability of being targeted for acquisitions. Following the acquisition, if stockholders believe that the M&A offers do not create value, they may file a merger-related lawsuit in a federal or state court. A recent report by Cornerstone Research (2019) shows that around 86% of M&A deals over $100 million that occurred between 2009 and 2018 were targeted by merger-related lawsuits. Megginson and Weiss (1991) and Krishnan et al. (2011) show that lead venture capital firms (VCs) do not fully exit at the IPO and remain invested for a few years post-IPO. Because they have limited fund life, they must divest their holdings. Lead VCs may do so by selling the entire public portfolio company (PC) to a strategic buyer since this allows them to shorten their divestment period and to make a large sale in a single transaction. Given that lead VCs have long associations with their PCs and may exit via M&As, does their presence affect litigation risk? This question has received little attention in finance literature to date, even though litigation is costly in terms of attorney fees and settlements[19]; diverts management's attention from important business concerns; disrupts customer, vendor and employee relationships; and create uncertainty with long delays in court proceedings.

M&As represent an external governance mechanism whereby the threat of acquisition should discipline managers to act in the best interest of shareholders (Scharfstein, 1988; Kini et al., 2004). However, in our experimental setup, because VCs are willing to sell their entire PCs to a strategic buyer, an acquisition does not operate as an external threat. Instead, merger-related litigation serves as a useful replacement tool whereby shareholders can file a lawsuit against the company or its management if they believe that the offer price does not represent fair value to target stockholders, company disclosures are not adequate, merger terms favor the purchaser, or minority shareholder interests are ignored. Considering that VCs intend to exit via M&As, they may force management to sell the company to the first available buyer at an unfair price or at the PC's lifecycle stage that is unsuitable for a merger. This conflict of interest between VCs and stockholders increases the probability of stockholders opting for the use of an external governance mechanism (lawsuits in this case). Or, VCs due to their long association with PCs before and after the IPO, may search for a buyer that will help develop the PC in a long run. In the latter scenario, VC monitoring/certification acts as an effective internal governance mechanism, thereby reducing the need for litigation. Therefore, VCs need to exit and their monitoring theoretically may lead to two differing likelihoods of ex-post litigation. To resolve the situation, we refer to an empirical analysis in this paper whereby we hypothesize that VC monitoring helps lower litigation risk.

We examine the interplay of VC presence and merger-related litigation in a setting in which VCs are searching for an exit and can act opportunistically. Specifically, we provide a detailed analysis of the determinants (and deterrents) of merger-related litigation, the role VCs play in this context, and the consequences of said litigation in terms of stock price reaction, merger completion, and takeover premiums. To do so, we follow US VC-backed companies that went public between 1996 and 2014 until they receive M&A offers. We manually search for lawsuits filed against the M&A offers in the Securities Class Action Clearinghouse (SCAC) database, as well as in Factiva, Lexis Nexis, and all pertinent SEC filings that are publicly available in

[19] See, e.g., the lawsuit against Zillow Group which reported $130 million and $13.5 million in settlement and legal fees, respectively, leading to a loss of $156.1 million for the second quarter of 2016. More details can be found in its 10-Q SEC filings - https://www.sec.gov/Archives/edgar/data/0001617640/000119312516673028/d197066d10q.htm.

the EDGAR online database. We conduct similar data collection to identify whether a lead VC is still present in each company when it receives a takeover bid, by manually reading the relevant SEC filings. After a thorough analysis, we find that the presence of a lead VC significantly reduces the probability of an M&A being targeted for merger litigation. Lead VCs help increase the initial takeover premium. This increased premium appears to positively influence investor sentiment during the merger process, increases the target company shareholders' wealth, and thereby helps reduce litigation risk.

Our paper provides important insights that relate to several strands of finance literature. First, it contributes to merger litigation literature. Thompson and Thomas (2004) explain the role of acquisition-oriented lawsuits in a corporate governance context and find that, rather than being a nuisance and despite their associated costs, these lawsuits add value for shareholders. Krishnan et al. (2012) study the effect of several variables such as offer size, presence of multiple bidders, cash financing, and target termination fees on the probability of merger-related litigation. We focus our analysis explicitly on the influence of VCs on merger litigation. Second, our study relates to institutional/blockholder literature. In this context, our study relates to Pukthuanthong et al.'s (2017) paper which differentiates between short- and long-term institutional investors and examines their influence on a company's litigation risk. We differ with respect to the type of institutional investor and primarily focus on VCs, whereby we examine the effect of VC presence in a given company in a unique setting where a VC invests in a PC before the IPO and is looking for an exit after the IPO through M&A. Third, we contribute to VC literature by examining the influence of lead VCs' exit behavior on both the occurrence and outcome of exit-related litigation. To the best of our knowledge, our study is the first to do so. Atanasov et al. (2012) study the effect of VC reputation on litigation but not in the context of VC exits. Similarly, Gompers and Lerner (1998) study short-run and long-run market reaction following VCs' share distributions to their LPs, but they do not examine M&A exits or the impact of VC presence on merger-related litigation. In all, we show that it is not just the initial, but also the continued presence of VCs that creates value in a PC. We argue that future research on VC firms around a given event should consider the presence of VC firms (after collecting VC ownership data) during the event rather than merely using a VC-backed IPO dummy which only captures initial VC involvement.

The remainder of the paper is organized as follows. Section 2 reviews and discusses related literature. Section 3 develops our hypotheses. Section 4 describes our data, defines our dependent and independent variables, and provides summary statistics. Section 5 presents our empirical results on VC presence and merger litigation, followed by Section 6, which explains the reasons behind the observed phenomena. Section 7 reports and interprets the investor reaction around merger and litigation announcements. Section 8 concludes the paper.

3.2 Literature review

Litigation has received considerable attention in finance literature since the 1990s when data became more available. Karpoff and Lott (1993) study the effect of alleged corporate fraud on the market value of the sued company and find the impact of the reputational cost from the fraud to be much larger than the cost associated to legal fees and penalties. Bhagat, Brickley, and Coles (1994) examine interfirm lawsuits between 1981 and 1983 and link a 1% drop in the defendant's stock price around the filing date to increased financial distress of the defendant. Koku, Qureshi, and Akhigbe (2001) differentiate between interfirm and non-interfirm lawsuits and find that former, but not the latter, significantly negatively affect the market value of the defendant. Similarly, Koku (2006) examines the effect of lawsuits by differentiating between class action and non-class action lawsuits and shows that class action lawsuits affect a company's stock price more negatively than non-class action lawsuits. Lowry and Shu (2002)

show that companies with higher litigation risk underprice their IPO more (insurance effect) and, in turn, higher underpricing leads to lower litigation costs (deterrence effect). More recently, Arena (2018) examines the effect of litigation on a firm's credit rating and documents a negative relationship between the two variables, leading to an increased cost of debt.

Most of the litigation literature does not focus on merger litigation. Among the few studies in this area, Thompson and Thomas (2004) explain several aspects of merger litigation including costs, frequency and types of lawsuits, and settlement issues. Similarly, Krishnan et al. (2012) study the effect of merger litigation on the likelihood of takeover completion and the takeover premium and find that firms that are sued have a lower probability of takeover completion rates and that for completed mergers, the takeover premium is higher. Cain et al. (2018) find that a higher percentage of total publicly announced M&A deals are involved in merger litigation since 2008. Even though the combined gain to all shareholders after a successful class action lawsuit is on average higher, the cost of the lawsuit to a particular plaintiff may outweigh the benefits. This higher cost may deter a shareholder from filing a lawsuit against a value-destroying management. To alleviate this problem, courts award counsel fees to successful plaintiffs. These counsel fees may, in turn, attract law firms to file more shareholder class action lawsuits. However, law firms may just pursue the counsel fees and may not facilitate improvements in the firms' governance mechanisms via ex-post litigation, raising another principal-agent problem (Coffee, 1986; Weiss and White, 2004). During the period 2009-2014, once an M&A was announced, it was common that several law firms announced investigations of the offer. Often these lawsuits were dismissed with the payment of mootness fees. Defendants would disclose additional information related to the merger as ordered by the court, but that information was often deemed insubstantial and not sufficient to improve shareholder value. This emergence of disclosure-only merger litigation was addressed by the Delaware Chancery Court by dismissing the case *In re Trulia, Inc Stockholder Litigation* in January 2016, citing concerns of immaterial disclosure. This decision is influential and has resulted in a lower number of merger-related litigation cases filed in Delaware since 2016. At the same time, Cain et al. (2018) as well as the 2018 report by Cornerstone Research[20] show that, following the Trulia decision, most merger litigation shifted from Delaware to other state and federal courts. It would be interesting to examine whether VC presence affects the litigation probability after 2016. However, because we examine VC-backed IPOs that receive M&A offers on average four to five years after the IPO, we do not have enough data to re-test our hypothesis with the new sample.

Barry et al. (1990), Megginson and Weiss (1991), Lin and Smith (1998), and Krishnan et al. (2011) find that VCs do not divest right at the IPO but continue to hold shares afterwards. Barry et al. (1990) find that the average VC (lead VC) ownership at the IPO is 34% (19.1%), while immediately after the IPO it is 24.6% (13.6%), and one year after the IPO it is 17.8% (11.6%). Using the earliest available statement within the three years post-IPO, Lin and Smith (1998) find that lead VCs hold, on average, 11.2% of the outstanding shares. This is comparable to Basnet et al. (2020) who find that lead VCs hold, on average, 9% of the outstanding shares at three years after the IPO and that their average exit time is 3.04 years post-IPO. The authors further show that lead VCs use different exit mechanisms such as share distributions, continuous sales in the open market, and M&As to divest their shares post-IPO.

Few studies examine the interaction of VCs and litigation against the company. Atanasov et al. (2012) show that reputation hinders VCs from acting opportunistically, resulting in a lower litigation risk. Sued VCs suffer in terms of securing future business compared to non-

[20] Available at https://www.nera.com/content/dam/nera/publications/2019/PUB_Year_End_Trends_012819_Final.pdf

sued VCs. Further, portfolio companies that are sued before they receive any VC funding obtain funding from less reputed VCs and face more scrutiny with multiple rounds of VC funding. However, their study does not explicitly analyze VCs and merger litigation, particularly not when VCs are searching for an exit. Considering that VCs can exit from a portfolio company via a merger, it remains to be tested whether they capitalize on the merger opportunity and act opportunistically, thereby increasing the risk of a merger-related lawsuit.

3.3 Hypotheses

Takeover bids for VC-backed IPO companies can happen (1) in the presence of the lead VC or (2) after the lead VC exits, as Figure 2 illustrates.

[Insert Figure 2 About Here]

Brau et al. (2010) and Mantecon and Thistle (2011) examine a dual-exit strategy whereby certain companies file for an IPO to subsequently get merged. This phenomenon is more prevalent in VC-backed IPOs in which lead VCs do not completely divest at the IPO. Since VCs have a finite fund life, after their investment period ends typically at the IPO, they need to search for exit routes. Basnet et al. (2020) show that lead VCs use M&As as one of the exit routes post-IPO. However, when faced with the pressure to divest because their fund life is nearing expiry, VCs may force their PC's management to opt for any offer that becomes available. The undue pressure thus can lead to non-optimal takeover decisions. Realizing that the M&A offer is not in their favor, shareholders may choose litigation to either stop the merger or change the merger deals. The flip side of this argument is that even though lead VCs are searching for an exit at the merger, they may not (cannot) act opportunistically because of the documented penalty of suffering from reduced future business from their potential LPs (Atanasov et al., 2012). Furthermore, because VCs are repeat players in the entrepreneurial investment field, investors likely perceive that lead VCs will not act opportunistically and sell their portfolio companies at a non-optimal price. We thus postulate our first hypothesis as follows:

Hypothesis 1. *Takeover bids that are made to target companies in which the lead VC is still present have a lower probability of being legally challenged than offers for companies from which the lead VC has already exited.*

We propose two explanations for the above phenomena. First, because lead VCs are active in PCs since their inception, the long association forces VCs to aid in the long-term prospects of the company. Thus, they continue to provide monitoring and other auxiliary services related to management, networking, marketing, product delivery, and strategy. In addition, VCs certify M&A offers through their presence (similar to IPO certification per Megginson and Weiss (1991)). A higher quality PC and/or certification allows management to demand a higher initial takeover premium from the bidders. This higher valuation favors shareholders who now do not need to resort to litigation as an external governance mechanism.

Hypothesis 2. *The presence of a lead VC in a takeover target leads to a higher takeover premium.*

Second, VCs' capacity to reduce the risk of litigation may be related to their characteristics, such as their previous experience in the entrepreneurial world. Lead VCs that are active for a longer period or have exited multiple portfolio companies in the past have greater experience in dealing with different exit mechanisms. This greater experience may result in a careful execution of a merger and thus lower the probability of becoming targeted in a merger-related lawsuit. In addition, such seasoned VCs are more likely to understand the impact of each exit

strategy (IPOs, M&As, secondary sales)[21] and govern their portfolio companies differently (Cumming and Johan, 2008). Krishnan et al. (2011) find that VCs with a higher past market share during the three years prior to the IPO are more actively involved in their portfolio companies, leading to better company performance post-IPO. Nahata (2008) also reports similar better monitoring by reputed lead VCs. Because these VCs monitor target companies more aptly, their presence during the merger reduces the risk of litigation. Thus, we predict that:

Hypothesis 3. *The presence of an experienced lead VC in an M&A target company lowers the probability of the merger being legally contested.*

Finally, due to the certification role provided by VCs and the higher premium they command, we predict that investors react more favorably to offers when the lead VC is present. Thus, we postulate our last hypothesis as follows:

Hypothesis 4. *The market reacts more positively to a takeover announcement and/or a merger-related lawsuit when a lead VC is present.*

3.4 Data

3.4.1 Data sample

We collect detailed information on 1,631 US VC-backed companies that went public between 1996 and 2014 from the Thompson Reuters SDC VentureXpert database. We choose 1996 as the start of our sample because the Securities and Exchange Commission (SEC) mandated all registrants to file their documents online using the EDGAR system that year. We end our IPO sample period in 2014 to allow enough time for each IPO company to receive an M&A offer. We remove VC-backed IPO companies (a) with an IPO price of less than $5, (b) with IPO proceeds of less than $5 million, and (c) that operate in the financial, insurance, or real estate industries. These filters decrease our sample size to 1,559 companies. We then merge this data with Thompson Reuters' SDC M&A database to identify all VC-backed IPOs that receive M&A offers by December 2018. We identify a total of 670 IPO companies with M&A offers. We follow these companies in the SCAC, Factiva, and Lexis Nexis databases as well as their SEC filings to identify whether the target companies were sued in connection with the merger. Finally, we gather detailed data on VC and PC characteristics as well as stock price and accounting information from the SDC Platinum Global Issues database, SDC Platinum VentureXpert, CRSP, Compustat, and FactSet. After merging all the databases, our final sample decreases to 642 VC-backed IPOs that received a total of 697 M&A offers.

3.4.2 Variable definitions

3.4.2.1 Merger litigation

We define a merger lawsuit as a lawsuit that is filed after a merger announcement and relates to the merger. These lawsuits can be shareholder class action lawsuits or derivative lawsuits (Thompson & Thomas, 2004). Once an M&A is announced, it is common that several law firms (and their plaintiffs) allege wrongdoing based on their belief that the offer price does not represent fair value to the target shareholders, that the company disclosures are inadequate and/or misleading, that the merger terms favor the parent and/or the purchaser, that the target management agreed to restrain other bidders, or that minority shareholder interests are ignored. In many cases, several lawsuits are filed against the target, the target's board of directors, and

[21] Please refer to MacIntosh (1997) for a detailed analysis of VCs' exit strategies.

the acquirer. Often multiple law firms file parallel lawsuits in different courts, which are consolidated into one lawsuit later.

We hand collect M&A litigation data from the SCAC website, Factiva, and Lexis Nexis searches. In addition, we web scrape all SEC filings containing the word "lawsuit" for each company, manually read each related document, and extract shareholder lawsuit details from these filings.[22] Some of the SEC filings that typically contain data about lawsuits are Form 8-K, Form 10-K, Form 10-Q, Schedule 14A, Schedule 14D-9, and Schedule TO. If we do not identify any lawsuits in connection to a given M&A offer following the above procedure, we set the litigation dummy for the M&A offer equal to zero.

3.4.2.2 Lead VC presence

We define lead VCs using the following sequential criteria:

1. The lead VC has the largest amount invested per the SDC variable "firms total known amount invested." If any potential lead VC invests after the IPO, we use its ownership at the IPO to identify the highest amount invested before the IPO.
2. If two or more potential lead VCs have the same amount invested before the IPO, we choose the one with the largest ownership in the portfolio company's S-1 filing (ownership before the offering).
3. If two or more potential lead VCs are listed with equal ownership in the S-1 filing, then we choose the one that holds one or more directorship positions (preferring the one with the larger number of directorship positions if multiple positions are held).

Using these criteria, we identify the lead VC for each VC-backed IPO (that subsequently received a takeover bid) and follow their ownership until the merger announcement date. We hand collect ownership data from several SEC filings such as the company's S-1, 424B4, DEF 14/A, DEFM 14/A, SC 13 G/D/A, and FORM 4. To facilitate data collection and ensure that we do not miss any publicly available ownership data, we web scrape SEC EDGAR for any filings that mention the name of the lead VC, its VC fund, or its manager. We carefully read each filing, ensure that the ownership data pertains to the lead VC and not the manager, and collect the necessary ownership data/VC presence information. Along with ownership data, we also manually check any filings before the merger announcement date that mention the lead VC to confirm that the lead VC is indeed present during the merger.

If we have ownership data for the lead VC around the merger announcement date and/or can confirm that the lead VC is present at the time of the takeover bid, we assign a value of one to our dummy variable labeled *lead VC present*. When the variable bears a value of one, it implies that the lead VC has not exited from the portfolio company and can, in fact, exit during the M&A.

3.4.2.3 Takeover premium

To calculate the takeover premium, we first subtract the target's closing stock price four weeks prior to the announcement from the offer price and divide the result by the former variable. We use the initial offer price to calculate the takeover premium because we intend to measure the effect of the takeover premium on the probability of merger litigation, the lawsuits being filed within seventeen (nine) days on average (median) of the merger date.

[22] SEC updated its website in July 2020 to allow for searches within the filings. Thus, future scholars interested in hand collecting the data can directly search for terms such as "lawsuits."

3.4.2.4 Lead VC characteristics

Our first measure of VC experience/reputation is lead VC age. We measure *lead VC age* as the difference between the merger announcement date and the lead VC founding date[23] or January 1, 1980, whichever is later. We start calculating the difference from January 1, 1980, because this date is considered the start of the modern VC era, corresponding to when the US Department of Labor relaxed the restrictions for pension funds to invest in VCs under the Employment Retirement Income Security Act (Gompers & Lerner, 1999; Rin et al., 2013).

Our second, third, and fourth measures of experience relate to the number of M&A/IPO exits of a lead VC. The *no. of previous M&As by the lead VC* variable includes the number of previous M&A exits by the lead VC. We count all companies, collected from FactSet, in which a lead VC has sold some or all their outstanding shares via a merger from the firm founding date or January 1, 1980, to one quarter prior to the merger announcement date. The *no. of previous IPOs by the lead VC* is the number of all IPOs, collected from the SDC database, from 1980 to one quarter prior to the merger announcement in which the lead VC was involved. The *first M&A by lead VC* is a dummy variable that equals one if a lead VC is not involved in any M&A before the merger, i.e., the lead VC is exiting from a portfolio company using a merger for the first time.

Finally, we measure the portion of a lead VC's life invested before the IPO using *investment period before the IPO* variable and define it as the difference between the lead VC's first investment date and the IPO date.

3.4.3 Summary statistics

Table 8 shows the distribution of the number of VC-backed IPOs, M&A offers, and sued offers by year. Our sample consists of a total of 1,559 VC-backed IPOs with the highest IPO volume in 1996 (235) and the lowest in 2008 (7). During the sample period between 1996 and 2018, 642 of these VC-backed IPOs received a total of 697 M&A offers. Out of these 697 M&A offers, 252 were legally contested in court.

[Insert Table 8 About Here]

Lead VCs are present in 299 of 697 M&A offers. Out of these 299 M&A offers, 73 (24.41%) were followed by lawsuits. The comparable figure for the 398 IPOs in which the lead VC has already left the company at the time of the takeover bid is 179 (44.97%). This provides some initial indication that fewer target companies face lawsuits if their lead VC is still present. Table 9 presents descriptive statistics for the independent and control variables. An average M&A offer is valued at $980 million with a mean *takeover premium* of 52%,[24] target company size of $372.97 million, *market-to-book ratio* (MTB) of 3.13, and *sales growth* of 3.78%. In Table 10, we examine the difference in our variables between VC-present and VC-absent samples. The *number of institutional blockholders* is higher in the VC-absent sample, likely because once a lead VC exits from a PC, other institutional blockholders take the opportunity to fill the void. Lead VCs may wish to exit with a higher return and may have both the negotiating power and expertise to accomplish this goal, leading to a higher *takeover premium*

[23] Some lead VCs are listed with incorrect founding dates in the SDC database. To address this issue, we manually match the SDC founding date with that of FactSet. If we identify any discrepancies, we search for the dates in Crunchbase, Bloomberg, company websites, and Google and correct our data.

[24] The minimum negative takeover premium of -82% listed in Table 2 refers to PeoplePC Inc. The company had a closing stock price of $0.12 four weeks prior to the merger announcement. The company's stock price declined sharply afterwards and it received an initial takeover bid of 0.02 per share on June 10, 2002. This led to a large negative takeover premium for the company.

in the VC present sample. Similarly, the market reacts more positively to merger announcements and less negatively to litigation announcements when the lead VC is present.

[Insert Table 9 and Table 10 About Here]

3.5 Lead VC presence and merger litigation

To examine the effect of VC presence on merger-related litigation, we use the following logit model.

$$\ln\left(\frac{Prob(Suit_i=1)}{1-Prob(Suit_i=1)}\right) = \beta_0 + \beta_1 Lead\ VC\ Present_j + \sum_{m=1}^{M}\beta_m Block_i + \sum_{n=1}^{N}\beta_n x_n + \gamma_i + \epsilon_i \quad (1)$$

where $Suit_i$ is a dummy variable that equals one if company i is sued in a merger related case, *Lead VC Present*$_j$ is a dummy variable that equals one if lead VC j is present when a takeover bid is announced for company i, $Block_i$ is a vector of institutional blockholder characteristics such as the number and type of institutional blockholders, and x_n is a vector of descriptive characteristics of the announced merger.

We already defined our variable of interest, *Lead VC Present*, in Section 3.4.2.2. We discuss our control variables herein. Following Barabanov et al. (2008) and Pukthuanthong et al. (2017) who show that institutional investors significantly affect litigation risk, we control for the *number of institutional blockholders* and *blockholder types*. Furthermore, following Krishnan et al. (2012), we control for M&A characteristics such as the *value of transaction, the presence of multiple bidders, cash payments, tender offers, termination agreement,* and *intra-industry mergers*. M&A offers with a higher offer price (a higher *value of transaction*) are targeted more often given the higher probability of recovering greater settlements as supported by the deep pocket theory in the legal literature (c.f., Alexander, 1991). *Multiple bidders* may create confusion among investors regarding which bidder's offer is in the best interest of the stockholders, thereby leading to more disputes and higher litigation risk. *All cash* payment mergers may exacerbate conflicting interests between majority and minority shareholders, again leading to more disputes. *Tender offers* give the target shareholders flexibility to tender their shares. Further, under the Williams Act of 1968, potential acquirers are required to fully disclosure the purpose of their offer, the source of funds used, and their plans after a successful tender. These disclosures benefit the target shareholders and should thus reduce the risk of litigation. Coates (2010) finds litigation to be less prevalent in US M&As with *termination agreements* because termination agreements deter bid competition which in turn lowers the proportion of contested bids. Finally, lower levels of information asymmetry should reduce the risk of litigation for *intra-industry mergers*.

We examine all VC-backed IPOs that are targeted for acquisition. Thus, by construction, we control for any selection biases towards choosing companies that have a higher probability of being acquired and facing a merger-related lawsuit. Furthermore, because we follow each sample company from its IPO to the merger offer, with each IPO being backed by a lead VC, we give equal opportunity to each lead VC to be present during the merger.

[Insert Table 11 About Here]

Table 11 presents the estimation results for Equation 1 using all M&A offers.[25] In Model 1, we include our *lead VC present* variable along with the control variables. We find a

[25] The total number of M&A offers in our final sample is 697. When using industry fixed effects in Table 5, Model 1, our sample size decreases to 682 because industries such as food products, printing and publishing,

significantly negative relation between lead VC presence and litigation risk at the 1% level, thereby confirming hypothesis H_1. A lead VC's presence during a M&A offer results in a 52.5% lower probability of facing a merger-related lawsuit. Megginson and Weiss (1991) report that the presence of VCs during an IPO can certify that the offer price reflects all available relevant information. Even though the target shareholders of an M&A offer have more information compared to diffused IPO investors, they still lack insider information that may be relevant to company valuation. The presence of a lead VC may substitute the usefulness of insider information. Lead VCs are involved in PCs for a long time before taking them public, continue to monitor post-IPO via holding board positions, and continuously assist in PCs' development. Stockholders are aware that lead VCs care about their PCs and thus assume that a future event (M&A in this case) happening in the presence of lead VCs will be optimal for the entire company, i.e., the presence of lead VCs can certify that the offer price is optimal for all parties involved. Consequently, stockholders do not perceive any wrongdoing by management or the board of directors of a target company and do not seek to file a lawsuit against the M&A offer. This certification finally leads to a lower litigation risk.

As predicted, *value of the transaction, all cash dummy*, and *termination agreement dummy* variables positively affect litigation risk. The results are similar even after we control for the number of institutional blockholders in Model 2. The institutional blockholder variable is significantly positive. This is in line with Pukthuanthong et al. (2017), who note that the higher litigation risk may be due to the presence of short-term institutional investors who have higher cost of monitoring internally and thus prefer to use external monitoring mechanisms, such as litigation. In Model 3, we further divide institutional investors into banks, insurance companies, investment advisors, investment companies, and others based on the Thompson 13f classification typecodes as in Barabanov et al. (2008) and Field and Lowry (2009). Our findings remain intact after including these variables. Among the investor types, only the investment advisor variable is significant. Investment advisors actively monitor their portfolio companies and react faster to M&As, in this context via litigation, which may explain the positive coefficient for this variable (Ashraf and Jayaraman, 2014).

3.5.1 Robustness tests

To ensure that our results are not biased, we conduct a battery of robustness tests. First, we employ a propensity score matching routine (1:1 matching with replacement) in Model 1,Table 12. We match VC-present M&A offers with similar VC-absent M&A offers based on firm size (total assets), market-to-book ratio, and Fama French 48-industry classification recorded at the end of the quarter preceding the M&A announcement. Our results reveal that the percentage of lawsuit filings in the presence of lead VC remain at a of 52% in Model 1, Table 12, similar to 52.5% in Model 3, Table 11.[26]

[Insert Table 12 About Here]

Second, we use an instrument variable (IV) setting to control for any omitted variables that may affect both VC presence and litigation risk. We use PC age and percentage change in stock price from the IPO date to IPO date + 182 days as IVs. To capture higher returns, VCs may

textiles, machinery, electrical equipment, etc. only have one offer in each industry and are thus dropped from the regression.

[26] Cornerstone Research 2016 reports that around 91% of all M&A deals valued over $100 million were legally challenged through shareholders lawsuits – a number that far exceeds the pre-2009 (2005-2008) litigation rate of 41.3% (Cain and Solomon, 2015). To accommodate for the unusually high number of lawsuits during those years, we restrict our IPO sample to the period 2009-2014. As expected, we do not find any significant effect of lead VC presence on the risk of litigation.

stay longer in younger PCs that have greater growth potential or may exit quickly when they observe a greater increase in stock price during the first 182 days of going public (Basnet et al., 2020). However, the same variables may not affect the probability of a lawsuit filing because the risk of litigation is more dependent on the characteristics of the merger and less so on the quality of a PC. A long history of operations, indicated by greater age, may include several instances such as patent infringement, product liability, worker compensation, etc., all of which can lead to the filing of various types of lawsuits but not merger-related lawsuits, as these depend on merger negotiation terms. These relationships between IVs and our variables of interest fulfill the exclusion restrictions and thus justify the use as instruments. Because linear probability models or control functions cannot accommodate the use of a binary endogenous variable, we resort to a variant of the special regressor developed by Lewbel (2000) and Dong and Lewbel (2015) in Model 2. We choose a logarithm of market value of target's equity as the special regressor as the variable fulfills all the criteria (i.e., is continuously distributed, exogenous, and appears as an additive term in the model). The higher market value of the target one quarter prior to the merger announcement should technically lead to a lower risk of litigation. Model 2 reveals that our earlier finding does not suffer from endogeneity concerns. The lead VC present variable is still negatively related to litigation risk.

Additionally, we implement the usual 2SLS IV method in Models 3 and 4. In Model 3, we predict the presence of lead VC using the previously mentioned two exogenous instruments. As expected, lead VCs exit faster in older PCs and when the change in stock price is higher during the first 182 days of going public. The predicted lead VC presence in Model 4 is negatively related to litigation risk, re-confirming our hypothesis.

3.5.2 Additional tests

Aside from participating in certification, lead VCs may continue to hold board positions and monitor the merger negotiation process. Lin and Smith (1998) report that 80.5% of lead VCs hold directorships at the IPO. Krishnan et al. (2011) find a substantial involvement of reputed VCs in the board until three years post-IPO. In our sample of 299 VC present M&A offers, lead VCs are present in 245 (89.10%) cases.[27] Considering the importance of VC monitoring, we replace VC presence with VC board position in Model 1,Table 13. We report that the probability of an M&A offer facing merger-related litigation decreases to 43.9%. Even though lead VCs are searching for an exit and can influence the acquisition decision via their board positions, they do not act opportunistically and influence management to sell the PC to any acquirer (non-optimal bidder) that bids for an acquisition. Lead VCs are involved in and/or are asked for advice during the negotiation process and in the due process only accept/favor the acquisition deal that creates value to target stockholders. As suggested by Megginson and Weiss (1991), Krishnan et al. (2011), and Atanasov et al. (2012), VCs act as an effective internal governance mechanism and thus reduce the need for governance via external mechanisms such as litigations. Considering the two differing arguments for the likelihood of ex-post litigation whereby VCs may either act opportunistically or provide monitoring, our results show that VC monitoring and certification act as dominant forces, removing any traces of opportunistic behavior leading to more litigation.

[Insert Table 13 About Here]

Similar to VC presence post-IPO, VCs' directorship may be endogenously determined. We follow a similar process as in Table 12 and implement special regressor and 2SLS methods

[27] In 24 M&A offers, we can determine that the lead VC is present during the M&A offer but cannot collect VC ownership and their board position. In these cases, several SEC filings only mention lead VCs at or near the merger announcement date.

using PC age and stock price change in the first 182 days as instruments in Models 2, 3, and 4 of Table 13. Our findings remain qualitatively similar and thus address any endogeneity concerns.

Additionally, it can be argued that VCs' behavior may change based on the percentage of ownership held at the time of merger. VCs with higher shareholdings may be more inclined to monitor the merger process. Thus, in Model 5 we replace VC presence with VC ownership. Our results show that higher ownership, just as is the case with the presence of VC, leads to a lower risk of litigation.

Furthermore, we examine whether our results hold for completed M&A deals in Model 6.[28] Our findings remain similar to those for the all-offer sample and support hypothesis H_1.

3.6 Takeover premium, VC characteristics, and merger litigation

After establishing the impact of lead VC presence during M&A offers, we examine the potential drivers behind the phenomenon.

3.6.1 Takeover premium

In this section, we examine whether the presence of a lead VC leads to a higher initial premium and subsequently to a lower litigation risk. To do so, we first test the influence of lead VC presence on the takeover premium in Models 1, 2, and 3 of
using the following equation:

$$Premium = \beta_0 + \beta_1 Lead\ VC\ Present_j + \sum_{m=1}^{M} \beta_m Block_i + \sum_{n=1}^{N} \beta_n x_n + \gamma_i + \epsilon_i \qquad (2)$$

where *Lead VC Present*$_j$ is a dummy variable that equals one if lead VC j is present when a takeover bid is announced for company i, *Block*$_i$ is the number of institutional blockholders one quarter prior to the M&A offer, and x_n is a vector of descriptive characteristics of company i and the M&A offer.

Schwert (2000) and Moeller et al. (2004) find a negative relationship between *target firm size* and premium. Their rationale is that bidders can easily afford paying high premiums for smaller targets. Similarly, potential acquirers may pay a lower premium for *highly levered* and/or *financially troubled* targets due to the increased financial risk they would face after acquiring the target (Walkling and Edmister, 1985; Comment and Schwert, 1995). Walkling and Edmister (1985) state that acquirers may gain more by buying *low MTB* firms and that they are thus willing to pay a higher premium, if required. Similarly, the authors argue that acquirers may be forced to pay a higher premium as competition grows with a higher *number of bidders* as the negotiating power of each acquirer is reduced. With higher *R&D expenses*, a target's future may be deemed to be bright, leading to an acquirer being willing to pay a higher premium. Schwert (1996) finds an increase in the premium associated with an increase in the target's *sales growth* and a decrease in the target's *PE ratio*. Similarly, a firm's stock *price runup* before the merger announcement may enable a target company to demand a higher premium (Eckbo, 2009). Higher synergy after acquiring a company in the same operational field leads to a higher premium in *intra-industry mergers* compared to those outside the industry (Flanagan and O'Shaughnessy, 2003). Travlos (1987) finds a significant stock price decline after *all stock* payment mergers which result in the targets demanding a higher premium compared to all cash acquisitions. As for *all cash* payments, target shareholders will most

[28] Note that out of the 642 VC-backed IPO companies in our final sample, 53 companies received multiple M&A offers until they were fully acquired.

probably demand a higher premium because they need to immediately pay taxes on the realized gains (Kaufman, 1988).

[Insert Table 14 About Here]

In Model 1, Table 14, we estimate an industry fixed effects regression without controlling for the number of institutional blockholders. We find a significantly positive relationship between the lead VC present dummy and the takeover premium. The presence of lead VC leads to a 9.5% increase in the initial takeover premium. *Total assets* (-), *MTB* (-), *PE ratio* (-), *price runup* (+), and the *all cash payment dummy* (+) are also significant as expected. When we add the *number of institutional blockholders* in Model 2, our independent variable remains significant but at a lower 10% level. In Model 3, we employ a similar propensity matching approach as in Model 1,Table 12. Our results again remain similar.

Lead VCs certify the merger. By staying invested after the IPO, lead VCs may bear the opportunity cost of not being able to fully divest at the IPO. Bayar and Chemmanur (2012) show that the expected payoff from selling shares at different points of time post-IPO is lower compared to its acquisition value, i.e., it is financially advantageous for a VC to exit via an acquisition rather than taking a PC public and continuously divesting shares post-IPO. Additionally, because VCs are repeat players in the entrepreneurial world, a false certification or an unwanted opportunistic behavior such as the dumping of shares via a merger can lead to a higher reputational cost. Atanasov et al. (2012) report that litigated VCs experience a decline in the number of future deals and raise smaller funds. Outside potential bidders thus realize that 1) the PCs are of high quality because VCs are invested despite the cost, and 2) these VCs will not act opportunistically due to higher reputational capital. Thus, the bidders can afford to pay a higher premium while acquiring VC present PCs. From the perspective of the target company, because VCs are active and provide monitoring during the negotiation process, they will demand a higher premium from potential bidders. A higher premium will increase their capital gain as well as create value for other diffused stockholders.

Because shareholders receive a higher price for their stocks compared to the market price, they may believe that the board of directors has properly performed its fiduciary duty and that the merger creates value for them. This eliminates some of the reasons for filing a lawsuit and thereby reduces the risk of litigation. To examine this phenomenon, we first predict the endogenous part of takeover premium using the *lead VC present* dummy in Model 3 and then estimate a logit regression (see Equation 1) to test whether the predicted premium negatively affects the probability of lawsuit filing. Model 4 shows that the predicted premium indeed reduces the risk of litigation. The presence of a lead VC enables companies to reduce the risk of litigation via an increased initial takeover premium.

3.6.2 VC characteristics

VCs' age and/or their experience with previous IPOs/M&As can affect their monitoring activity. To test whether these VC characteristics affect the risk of litigation, we run similar logit regressions as Equation 1 but only for those offers where the lead VC is present. We replace the *lead VC present* dummy with VC characteristics such as *lead VC age*, the *number of previous M&As by the lead VC*, the *number of previous IPOs by the lead VC*, a dummy variable identifying the *first M&A by the lead VC*, and the *investment period before the IPO* in Model 1 to 5, respectively, in Table 15.

[Insert Table 15 About Here]

Model 1 in Table 15 shows that the presence of *older VCs* increases an M&A target company's probability of facing a lawsuit. This does not support hypothesis H_3. This could potentially result from older VCs with many prior successful exits being less careful at exiting

their portfolio companies during an M&A, resulting in higher litigation risk. The less careful nature of older VCs is also supported by grandstanding to build reputation (Gompers, 1996). Given that older VCs or VCs with a greater *number of previous M&As* (as in Model 2) have already established their reputation through multiple previous exits, they do not need to rely on this particular M&A, thereby creating an environment that favors a less careful formulation of merger terms. In addition, even if older VCs face lawsuits, these lawsuits do not result in reduced future business activities, as documented by Atanasov et al. (2012); even if they do, the implications are significantly reduced compared to younger VCs with less established reputation.

The *number of previous IPOs by the lead VC* is insignificant in Model 3 while the *first M&A by the lead VC dummy* exhibits a significantly negative relationship with litigation risk in Model 4. Consistent with our earlier findings, this suggests that seasoned VCs may exercise less care when exiting an IPO company via an M&A transaction. Lead VCs that are involved in an M&A offer for the first time are more careful and, arguably, plan the merger more aptly, which reduces the probability of a related lawsuit filing. Similar to grandstanding via IPO, M&A also play an equally important role in reputation-building, thereby providing incentives for VCs to carefully plan their exit (Amor and Kooli, 2020).

In addition to VC experience, the VC's investment period may also affect the monitoring mechanism. VCs have a finite fund life. They need to divest their investments so that they can return the capital to their limited partners (LPs) and start a next fund cycle. If VCs invest late during the lifecycle of a given fund and/or their PC takes more time until it goes public, they will have less time to exit post-IPO. Because they are forced to exit faster, they may be less careful or act opportunistically (perhaps even exerting their influence to sell the company at an inappropriate price) in order to ensure their exit. This can lead to a higher probability of litigation against the company and/or the VC. We use the *investment period before the IPO* variable to test the phenomena in Model 5. The significant positive coefficient suggests that the longer the time a lead VC spends before an IPO, the higher will be the litigation risk. This is consistent with Basnet et al.'s (2020) findings, which show that lead VCs with longer investment periods tend to have shorter exit times after the IPO. As these VCs are forced to exit faster, they may accept any deal that allows them to divest their shares and do not attempt to maximize shareholder value. This possibly rushed decision may result in higher litigation risk.

3.7 Investor reactions in the presence of a lead VC

In this section, we examine the market reaction to both the merger announcement and litigation date in the presence/absence of the lead VC. To do so, we conduct an event study using Eventus. To estimate the return generating process, we use the Fama-French-Carhart four factor with an estimation period ranging from 365 to 100 days prior to the event day. We then use the return-generating process to calculate abnormal returns (AR) and cumulative abnormal returns (CAR) over several event windows as shown in Panel A, Table 16. We classify companies via the VC present/absent dummy and test the mean difference between the two groups. Finally, we estimate a series of multivariate regressions with the CAR over a three-day period around the event (-1, 1) as the dependent variable as shown in the following equation:

$$CAR_i = \beta_0 + \beta_1 Lead\ VC\ Present_j + \beta_2 Premium_i + \sum_{n=1}^{N} \beta_n x_n + \epsilon_i \quad (3)$$

where *Lead VC Present*$_j$ is a dummy variable that equals one if lead VC j is present when a takeover bid is announced for company i, *Premium*$_i$ is the initial premium offered by the acquirer for the target, and x_n is a vector of descriptive characteristics of the M&A offer and the target company i following Officer (2003) and Cornett et al. (2011).

3.7.1 CARs around the merger announcement date

Panel A, Table 16, shows that the CAR around the announcement of VC-present M&A offers is significantly different from that for VC-absent offers during the (-1,1), (1, 5), and (1, 15) event windows. The difference can also be observed in Figure 3 where the CAR of VC-present offers, represented by a solid line, is higher on and after the event date.

[Insert Figure 3 About Here]

Model 1 in Panel B, Table 16, shows that lead VC presence during an offer significantly positively affects cumulative abnormal returns with the three-day CAR (-1, +1) being higher in the presence of the lead VC. This suggests that investors are more optimistic about offers for target companies in which the lead VC is present. They consider the offer to be in the best interest of the target company's shareholders and thus do not perceive any wrongdoing. Subsequently, investors do not flock to file a lawsuit. The positive significance persists even when we employ a propensity score matching routine based on firm size, MTB, and industry.

[Insert Table 16 About Here]

3.7.2 CARs around the first lawsuit filing date

Next, we test whether investors react differently around the litigation date in the presence or absence of the lead VC. Even though M&A offers for companies in which the lead VC is present have a lower probability of being targeted in a merger-related lawsuit, some offers (69 in our sample) are eventually followed by a lawsuit. The presence of a lead VC may build confidence in investors regarding the dismissal of the lawsuits or the successful completion of the merger. This higher confidence appears to be reflected in a higher CARs around the respective lawsuits. In a univariate setting (Panel A), we observe significantly higher CARs for the VC present sample in all event periods except on the litigation date. The different investor reactions are also evident in Figure 4. The cumulative abnormal return after the litigation date is negative for offers in which the lead VC is absent while it is positive when the lead VC is present.

[Insert Figure 4 About Here]

We find some support for hypothesis H_4 with significant positive coefficients for the *lead VC present* dummy in Models 3 and 4 in Table 16.[29] However, this finding should be viewed with caution, because merger-related lawsuits are often filed within a few days of the merger (sometimes even on the day immediately following the merger announcement), causing the litigation-related stock price effect to be attenuated by the merger announcement.

3.8 Conclusions

Given the growing number of merger-related lawsuits, as reported in several Cornerstone Research reports and Cain et al. (2018), as well as the growing burden these lawsuits place on target and acquiring companies, merger litigation is generating increasing interest among investors and scholars in corporate finance. Krishnan et al. (2012) examines the effect of IPO and merger characteristics on the probability of the M&A offers being legally challenged. Advancing the field, we analyze the effect of VC presence on merger-related litigation risk. While searching for an exit, VCs may opt for a quick exit by influencing the sale of the PC to a first available buyer, normally at a non-optimal price. Alternatively, they may continue their monitoring activities during the merger, leading to a favorable takeover. The former may force

[29] Our results do not change significantly when we use either a market model or the Fama-French 3 factor model to capture the return generating process or when we change the event period from a three-day to a seven- or fifteen-day period.

stockholders to file class action lawsuits against the offer while the latter scenario deters this possibility. In this paper, we examine this phenomenon empirically.

We use US VC-backed IPOs from 1996 to 2014 that are targeted for acquisition to identify whether these mergers are legally contested. We find that the presence of VCs in the target companies helps lower litigation risk. Lead VCs help increase the initial takeover premium that positively affects the investor reaction during the offers and appears to percolate to a reduced risk of litigation for the respective target company. Other than VC certification, VC monitoring acts to reduce the risk of litigation only when the lead VC is exiting a PC via a merger for the first time. VCs that use M&A exits for the first time are arguably more careful and thus search for potentially value increasing takeover.

Chapter 4: The effect of VC exit choice on M&As post-IPO

4.1 Introduction

Venture capital firms (VCs) raise funds from their limited partners (LPs) for a period of 10-12 years. They invest the amount in high-risky entrepreneurial companies in their first 5-7 years and then search for exit routes in the remaining period. These exits can happen via IPOs, M&As, secondary sales, or liquidation (Cumming and MacIntosh, 2003). Not all exit routes provide a complete exit. For eg: in case of IPOs, Barry et al. (1990), Megginson and Weiss (1991), and Krishnan et al. (2011) show that VCs continue to hold a substantial portion of their investment post-IPO. Lead VCs in fact rarely sell their shares at the IPO. Now, because VCs' fund life is limited, they must find a route to exit post-IPO. Gill and Walz (2016) show that VC-backed IPOs are acquired more often compared to non-VC backed IPOs. Does this mean that VCs aid in the post-IPO merger? This important question remains to be answered.

VCs can divest their investment post-IPO by selling shares in the open market or distributing the shares to their LPs or selling their portfolio companies (PCs) to a strategic buyer (Basnet et al., 2020). Lin and Smith (1998) show that lead VCs, on average, hold around 12% of the PC's outstanding shares right after the IPO. Divesting many shares via open market sales takes a long time and if not done properly, VCs may face insider trading charges. As for share distribution, not all LPs wish to receive PC's shares and take on the project of selling shares by themselves. Instead, they may prefer to receive cash. M&As, on the other hand, provide a quicker exit route to lead VCs if timed properly. Lead VCs provide certification to the merger just as they certify IPOs as indicated by Megginson and Weiss (1991). Besides, being a public company, the information asymmetry to the transaction should be lower, particularly so when a long-time associated blockholder is still present in the company. Both certification and reduced information asymmetry facilitates for a quicker transaction. In addition, during a takeover lead VCs can demand a higher premium compared to the then market value. And, as always selling the entire PC allows lead VCs to divest all of their holdings in one single transaction which then allows them to return the capital and profits to their LPs in one lump sum.

Next, the question arises - if M&As are advantageous, why don't VCs use them to exit a private company and instead take a company public first and then sell it via a takeover. Brau, Francis, and Kohers (2003) find that there is a 22% discount in takeover exits compared to IPO exits. Similarly, Brau, Sutton, and Hatch (2010) report a 18-21% higher premium for a public sell-out compared to private sell-outs. These studies, thus, demonstrate the benefits of a dual-track strategy. But, does this mean that lead VCs encourage their PC's management to sell a PC via a merger. Gill and Walz (2016) find that around 70% of US VC-backed IPOs were taken over compared to 22% of non-VC-backed IPOs. However, the authors investigate the phenomenon at the time of the IPO which leaves room for future researchers to examine the phenomenon at the time of takeover and identify whether lead VC is involved in the process.

To fill the gap in the previous literature, we hand collect VC ownership data post-IPO and follow lead VC until their exit to identify whether a lead VC is present during a merger announcement. We focus only on lead VCs because they provide the largest investment, offer most important auxiliary services, operate in the PC since the first or second round of funding and have a greater influence in the management. We find that presence of lead VC increases the probability of a PC receiving a takeover bid. Even though VCs are searching for exit, they do not try to influence the PC management to avoid the adoption of anti-takeover provisions (ATPs) to facilitate the post-IPO mergers. Instead, their presence significantly increases the speed of takeover completion and also help demand higher takeover premium. Additionally, compared to acquirers of lead VC absent companies, acquirers of lead VC present companies

do not suffer in terms of market performance. In summary, VCs provide support to target shareholders, along with their own exit, but in the process do not hamper an acquirer's prospect.

Our study contributes to the finance literature in the following ways. First, we relate to VC exit literature whereby we examine VCs' post-IPO exits. Barry et al. (1990) find that VCs continue to remain invested even after the IPO. If so, VCs should be involved in various post-IPO partial or full exit routes. Gompers and Lerner (1998) examine post-IPO VC share distribution while Field and Hanka (2001) study VC sales right after the lockup expiry. Gill and Walz (2016), on the other hand, indicate that VC-backed IPO companies are acquired more often compared to non-VC-backed IPO companies. We hand-collect lead VC ownership data and exactly identify whether lead VC presence leads to a higher probability of their PC's being targeted for takeover. Second, we relate to the VC literature that examines their opportunistic nature. Atanasov et al. (2012) find that reputed VCs have a lower probability of being litigated. Even though we do not explore litigation, we examine the effect of lead VC's actions on target and acquirer shareholders in a setting when there is a higher probability of these VCs to be more selfish and only caring about their divestment. In other words, our empirical setup allows us to examine whether VCs act opportunistically during their exit. Third, we relate to corporate governance by blockholders. We show that lead VCs due to their long association before the IPO care more about the long-term success of their PCs and thus favor the adoption of ATP measures.

Our paper is structured as follows. We summarize previous literature in section two and explain our hypotheses in section 3. We mention our data sources, define our variables, and provide summary statistics in section 4. We test our main hypothesis in section 5 while analyze the opportunistic nature of VC in section 6. Finally, we conclude in section 7.

4.2 Literature review

Cumming and MacIntosh (2003a) explain that VCs can use IPOs, acquisitions, secondary sales, buybacks, and liquidation to divest their equity stakes in their PCs. If VCs can reduce information asymmetries and agency cost between the new owners, they are more likely to have a successful exit (Cumming and Johan, 2008). These successful exits primarily happen via IPOs or acquisitions. Bayar and Chemmanur (2011) find that companies with viable marketable products, in more capital-intensive industries, with founders more inclined to enjoy greater benefits of control, and that have a more favorable public valuation are more likely to opt for IPOs compared to acquisitions. These exit strategies can still take the form of partial or full exit (Cumming and MacIntosh, 2003b). A partial exit occurs when VCs sell only a fraction of their holdings while a full exit includes the divestment of all shares in a PC. For eg. in case of mergers, VCs may sell the entire PC, along with all of their investments, to a strategic buyer while in case of IPOs, they may sell only a fraction of their shares. These decisions are in fact determined more by the expected marginal benefit opposed to expected cost in maintaining the projects (Cumming and Johan, 2010).

IPOs has always been regarded as the most successful exit strategy. However, not all VCs divest fully at the IPO date. Lin and Smith (1998) show that VCs hold, on average, 7.9% of the outstanding shares right after the IPO. The figure for lead VCs is 9.4% (Krishnan et al., 2011). Because IPOs are the most prized assets for VCs, they may wish to remain invested for a longer time and capture any additional value-added opportunities. In addition, lead VCs may not wish to sell their shares at the IPO because doing so will send a negative signal to the market. This negative signal is particularly severe because of the higher information asymmetry between lead VCs and diffused outside IPO investors. Thus, VCs remain invested during the IPO. Basnet et al. (2020) show that lead VCs rarely sell shares at the IPO and following the need to

search for exit, they primarily use continuous sales in the open market, share distributions to limited partners, and acquisitions.

Brau et al. (2010) find that VC-backed companies have higher probability of choosing a dual track strategy – go public/withdraw IPO to be acquired later. Companies that withdraw IPO to subsequently get taken over enjoy a 22-26% higher premium compared to those that are acquired without any intentions to go public. Similarly, those that go public and are subsequently acquired enjoy a 18-21% higher premium compared to single-track sellouts (Brau, Sutton, and Hatch, 2010). Mantecon and Thistle (2010) also report a 40% larger payoff for owners of the public companies that chose to do an IPO before an acquisition compared to owners that had an option to take their companies public but chose private acquisition. Mantecon and Thistle (2011) relate this higher premium to effective screening role of the IPO process while Officer (2007) focus on liquidity discount for private targets. Gill and Walz (2016) also report that VC-backed IPOs have higher probability of getting merged post-IPO compared to non-VC-backed IPOs. However, does dual track strategy indicate VCs intention to divest via M&As post-IPO? VCs can use various exit mechanisms to divest their holdings post-IPO and do not necessarily rely on acquisitions. Furthermore, the forementioned studies do not relate the influence of institutional owners on the occurrence of acquisition. The influence could have been examined by collecting ownership data post-IPO or examining whether the investors are involved in the negotiation of the merger terms. Identifying this deficiency, with the help of lead VC ownership data, we examine the role of lead VC presence in the probability of receiving M&A offers.

4.3 Hypotheses

Barry et al. (1990), Lin and Smith (1998), and Krishnan et al. (2011) show that VCs continue to hold shares even after the IPO. Basnet et al. (2020) show that lead VCs rarely sell shares at the IPO and stay invested for on average of three years post-IPO. With limited fund life as defined in their term agreement with their LPs, VCs are forced to exit post-IPO. M&As allow them to sell all of their holding at once and may even provide a higher premium compared to the market price. Thus, lead VCs may be more inclined to use this exit mechanism post-IPO, leading to more mergers.

H_1: The probability of receiving a takeover bid is higher whenever a lead VC is present in a VC-backed IPO company.

VCs provide financing and auxiliary services related to human resources, management and marketing (Gorman and Sahlman, 1989; Hellmann Puri, 2002). They are the driving forces behind corporate innovation (Bernstein, Giroud and Townsend, 2016). They invest in risky investments and make them successful projects. They provide certification role at the time of the IPO (Megginson and Weiss, 1991) and continue to add value even after the IPO (Krishnan et al, 2011). In addition, since they are repeat players in the entrepreneurial finance world, they care about their reputation. Atanasov et al. (2012) report that VCs suffer decline in future fund-raising prospects if they are litigated. Thus, VCs should not act selfishly and care about the PC and their shareholders despite the pressure to exit faster pos-IPO.

H_2: Lead VCs do not behave opportunistically while exiting via M&A post-IPO.

4.4 Data

4.4.1 Data sample

We collect 5,084 US companies that went public between 1996 and 2014 from Thompson Reuters SDC Global Issues database. We begin our sample period from 1996 because of the ease of availability of company filings in Electronic Data Gathering, Analysis, and Retrieval

(EDGAR) online database as mandated by the Securities and Exchange Commission (SEC). We end our sample period in 2014 to allow PCs enough time to receive any post-IPO M&A offers. We remove IPO companies (a) with an IPO price of less than $5, (b) with IPO proceeds of less than $5 million, (c) with multiple share classes at the IPO, (d) unit offerings and (e) firms that operate in the financial, insurance, or real estate industries. These filters decrease our sample size to 3020 IPOs, out of which 1,522 are VC-backed IPO companies. We then merge the resulting data set with Thompson Reuters SDC M&A database to identify all IPO companies that receive M&A offers during the period between 1996 and 2019.[30] We supplement this dataset with hand-collected lead VC presence data from several SEC filings, PC and VC characteristics from SDC and Compustat database, and stock return data from CRSP. Our final sample includes 2,796 IPOs that receive a total of 1,695 M&A offers.[31]

4.4.2 Variable definition

We define lead VCs using the following sequential criteria: 1) A lead VC must have the highest amount invested as per the SDC variable 'Firms Total Known Amount Invested'. We exclude any VC that has invested only after the IPO and use ownership at the IPO for any VC that invested both before and after the IPO. 2) If two or more VCs fulfill criteria 1, we choose the one with the highest ownership as per the PC's S-1 filing, whereby we focus on ownership before the IPO and not immediately after the IPO. Focusing on ownership before the IPO allows us to avoid any share dilution at the IPO and correctly identify the largest VC shareholder. 3) If two or more potential lead VCs fulfill criteria 1 and 2, then we choose the one that holds a directorship position/s (preferring the one with the higher number of directorship positions if multiple positions are held).

Once we identify lead VC, we follow their ownership until their exit using several SEC filings such as the company's S-1, 424B4, DEF 14/A, DEFM 14/A, SC 13 G/D/A, and FORM 4. To ensure that we do not miss any publicly available ownership data, we web scrape SEC EDGAR for any filings that mention the name of the lead VC, the lead VC fund and their manager and manually read each filing to collect any necessary ownership data/VC presence information. Along with the ownership data, we also manually check any filings before the merger announcement date that mention the lead VC to confirm that the lead VC is indeed present during the merger. If we can confirm that the lead VC is present during the M&A offers, we create a dummy variable called *lead VC present*.

We relate lead VC present dummy with M&A offer, adoption of ATPs, takeover completion, days to completion, and takeover premium to test our hypothesis. *M&A offer* is a dummy variable that takes on a value of one if a PC receives an M&A offer, and zero otherwise. If an M&A offer successfully leads to takeover completion, then we create another dummy variable named *takeover completion*. For these completed mergers, we count the number of days in between the offer announcement date and the completion date and form the variable *speed (days to completion)*. In addition, we calculate *takeover premium* by subtracting one from the ratio of initial offer price to target's stock price four weeks prior to the announcement. We include the definition of all other variables in Appendix 1.

4.4.3 Univariate analysis

Table 17 shows the distribution of US IPOs and their related post-IPO M&A offers per year. Our sample includes 2,796 US IPO companies, out of which 1,374 are VC-backed. These VC-backed IPOs have a higher probability of receiving M&A offers compared to total IPOs.

[30] We track lead VC ownership till the end of 2019. Thus, we limit M&A dataset to 2019.
[31] Same company can receive multiple offers at different dates.

On average, 61% of total IPO companies receive takeover bids. This percentage figure increases to 66% for VC-backed companies and decreases to 56% for non-VC-backed companies. Table 18 contains descriptive statistics of our independent and control variables for VC-backed IPO companies. Lead VCs are present in 38% of our sample companies receiving takeover bids. At the IPO, VC-backed companies raise on average $74 million, are underpriced by 34%, have total assets of $150 million, and have a leverage ratio of 13.5%. Panel B, Table 18 shows that PCs have a higher probability of being targeted for M&A when lead VC is present compared to when a lead VC is absent. VC present sample also has lower market-to-book (MTB) ratio, fewer sales, and relatively lower free cash flow. But, in terms of facilitating the merger, lead VC present samples provide a better advantage with fewer days to complete a merger and even providing a higher takeover premium for target stockholders.

[Insert Table 17 and Table 18 About Here]

Table 19 includes the pairwise Pearson correlation coefficients between our dependent and independent variables. We observe that lead VC present dummy variable is significantly positively correlated to the M&A offer dummy variable, providing some initial support to our hypothesis H_1. The relation remains significant even when we limit our definition of IPO companies as those that are within 5 years of operation from the IPO date. Among the control variables, underpricing seems to be the only variable that is significantly related to M&A offer dummy variable.

[Insert Table 19 About Here]

4.5 Probability of a takeover in the presence of lead VCs

We employ the following logit regression to examine the effect of lead VC involvement on a PC's probability of receiving a post-IPO M&A offer in Table 20.

$$\ln\left(\frac{Prob(M\&A_i=1)}{1-Prob(M\&A_i=1)}\right) = \beta_0 + \beta_1 Lead\ VC\ Present_j + \sum_{n=1}^{N}\beta_n x_n + \gamma_i + \epsilon_i \qquad (1)$$

Where, $M\&A_i$ is a dummy variable that equals one if a PC i receives an M&A offer after the IPO, *Lead VC present*$_j$ is a dummy variable that equals one if lead VC j is present when a takeover bid is announced for the company i, x_n is a vector of control variables related to the PC or IPO, and γ_i is the industry fixed-effects based on Fama-French 48 industry classification. Following Gill & Walz (2016), we control for IPO characteristics such as offer size and underpricing, and PC characteristics at the IPO such as total assets, MTB ratio, leverage, capital expenditure and free cash flow.

[Insert Table 20 About Here]

Revisiting Gill and Walz (2016), we first test whether VC-backed IPO companies receive more M&A offers. Model 1 of Table 20 shows that VC-backed IPO dummy is positively significant, indicating a higher probability of VC-backed companies receiving M&A offers. The result remains qualitatively similar when we employ a propensity score matching routine (1:1 matching with replacement) based on firm size (total assets), MTB ratio, and Fama French 48-industry classification in Model 2. Following the positive relation with VC-backed IPO dummy, we test our hypothesis 1 in Models 3 (all VC-backed IPO sample) and 4 (PSM lead VC present sample). Both models provide strong support to our hypothesis. This finding is in line with Anderson, Huang, and Torna (2017) who find that share overhang, pre-IPO shareholders retaining their shares after the IPO, result in a higher likelihood of the IPO company to be targeted for a takeover during the first three years of going public. Anderson et al. (2017) consider founders, venture capital firms, or any other investors investing in a private company as a group and do not distinguish between their motives to influence a subsequent

takeover. Since Basnet et al. (2020) show that lead VCs do not fully divest at the IPO and are searching for exit routes post-IPO, they may probably consider a PC sellout as a successful exit route, thereby increasing the takeover likelihood. In addition, by identifying VC presence during an M&A offer, we show that lead VCs are directly involved in selling their PCs. This finding also closes the gap in Gill and Walz (2016) where they do not link VC involvement over the years to the merger but refer to VC-backing at the IPO date. By doing so, their model does not allow them to identify whether the merger happens pre- or post-VC exit. Our hand collected ownership data till VC exit helps us remedy the situation and identify who (lead VCs in our case) is behind the phenomenon.

As further robustness tests, we first limit the time horizon of IPO companies within 5 years of going public. Barry et al. (1990) track VC-backed IPO companies for five years until IPO. Public companies that have existed for more than 5 years post-IPO may not be classified as IPO companies but may better be termed as secondary companies. Thus, we stop tracking PCs after five years from the IPO date. Accordingly, we define lead VC present dummy based on whether a lead VC is present during the entire first five years of a PC's post-IPO life or is present until the PC is delisted during its first five years of going public. Industry fixed effects regression in Model 5 shows that our finding does not change when we define IPO companies differently.

Furthermore, it could be argued that had the private VC-backed companies not been acquired, they could have gone public and subsequently get merged. This may affect the probability of a post-IPO merger and thereby create a selection bias problem. To address this issue, we use Heckman procedure, whereby we predict the probability of going public using high technology industry dummy, high IPO dummy, and total VC investment before the IPO (Brau, Francis, and Kohers, 2003; Giot and Schwienbacher, 2007; Cumming and Johan, 2008). Our inverse mills ratio is insignificant and thus confirms that there is no selection bias.[32]

4.6 Opportunistic nature of lead VC

VCs certify the quality of the PCs and thus they receive more M&A offers. But, do they add value to the PC during their exit? To answer this question, we analyze the use of ATPs, characteristics related to takeover, and acquirer's cumulative abnormal returns (CAR) in this section.

4.6.1 Anti-takeover provisions

Because lead VCs are searching for exit routes post-IPO, they may try to influence the PC's sell out right after the IPO. One of the ways to facilitate their exit is to try to prevent the PC from adopting ATPs. Without ATPs, lead VCs signal that they wish to sell their PCs to a strategic buyer and thereby increase the probability of receiving a takeover bid. However, without ATPs, the company is prone to threats from external takeover. To protect their positions, executives may act myopic, boost short-term profits, and create a false positive impression of the company. These management actions will hinder the long-term prospects of the PC. The situation is particularly dire when a private company transitions to a public entity, whereby just to increase the survival of the company, management may have to try to establish long-term associations with external stakeholders. Thus, if we assume that VCs are not opportunistic, they will not prevent the use of ATPs.

To test our hypothesis, we use classified boards as one of the ATP measures. We web scrape SEC EDGAR website to collect all 10-K filings of our sample companies and identify

[32] Because there is no need to adjust for selection bias, we do not report the first stage regression of the Heckman procedure.

whether a company has a classified board in a fiscal year. We then merge this annual dataset with lead VC presence, institutional ownership and Compustat data. Finally, we estimate the following regressions to predict whether lead VC presence affects the probability of occurrence of classified boards.

$$\ln\left(\frac{Prob(boards_i=1)}{1-Prob(boards_i=1)}\right) = \beta_0 + \beta_1 Lead\ VC\ Present_j + \sum_{n=1}^{N}\beta_n x_n + \gamma_i + \epsilon_i \quad (2)$$

Where, $boards_i$ is a dummy variable that equals one if a PC i has classified boards during a year, *Lead VC present*$_j$ is a dummy variable that equals one if lead VC j is present in a company i during a year t, x_n is a vector of control variables related to the PC, and γ_i is the industry fixed-effects based on Fama-French 48 industry classification.

[Insert Table 21 About Here]

In Model 1 of Table 21, we examine the influence of VC-backing on classified boards. Because VC-backing is observable at the IPO and remain the same in future years, we only examine classified boards at the IPO year. VC-backing significantly positively affects the probability of use of classified boards. However, this empirical setup does not allow us to examine the dynamic impact of VCs. Thus, in Model 2, we include all fiscal year data of VC-backed IPOs from the IPO year until the PC delists or the year 2019. We find that classified boards are more prevalent in years when lead VCs are present compared to the years when they have exited. Lead VCs help foster long-term growth by protecting the PCs from takeover. Gorman and Sahlman (1989), Hellman and Puri (2002), and Bernstein, Giroud, and Townsend (2016) show that VCs aid in their PCs' development during the investment phase of their funds. Our results show that this behavior of lead VCs continues even during the divestment period and thus provides strong support to our hypothesis H_2. Additionally, in Model 3, we change the definition of IPO companies to include companies within five years of going public. Lead VC present dummy variable becomes insignificant. VC presence during the first five years does not appear to affect the probability of occurrence of classified boards.

4.6.2 Takeover completion, speed, and premium

In Table 22, we examine whether VC involvement leads to differing level of takeover completion, speed of merger, and the takeover premium using the following models.

$$\ln\left(\frac{Prob(M\&A_i=1)}{1-Prob(M\&A_i=1)}\right) = \beta_0 + \beta_1 Lead\ VC\ Present_j + \sum_{n=1}^{N}\beta_n x_n + \gamma_i + \epsilon_i \quad (3)$$

Where, $M\&A_i$ is a dummy variable that equals one if an M&A offer is completed, and zero otherwise.

$$Y_i = \beta_0 + \beta_1 Lead\ VC\ Present_j + \sum_{n=1}^{N}\beta_n x_n + \gamma_i + \epsilon_i \quad (4)$$

Where, Y_i is either the speed of the merger completion (days to completion) or takeover premium, *Lead VC present*$_j$ is a dummy variable that equals one if lead VC j is present when a takeover bid is announced for the company i, x_n is a vector of control variables related to the PC or the merger measured at the end of one year prior to the announcement and γ_i is the industry fixed-effects based on Fama-French 48 industry classification. We use equation 3 in Models 1 and 2 and equation 4 in the remaining models in Table 22. In all our models, we control for PC characteristics such as institutional ownership, total assets, MTB, leverage, capital expenditure and free cash flow, and merger characteristics such as intra-industry merger, tender offer, hostile offer, all cash or stock payments and number of bidders.

[Insert Table 22 About Here]

We find that lead VC involvement does not affect the probability of takeover completion but significantly reduces the days to completion and helps increase takeover premium. On average, lead VC presence reduces the days to completion by 12 days and helps demand a higher initial premium by 10%. These findings are robust even after employing propensity score matched routine based on firm size (total assets), MTB ratio, and Fama French 48-industry classification in Models 2, 4 and 6. Lead VCs monitor their PCs continuously and thereby aid in the takeover process. The increased speed is favorable to all parties – acquirer, target and lead VC while the higher takeover premium aids to lead VC's exit as well as creates value for all target shareholders. In this regard, lead VCs do not act opportunistically i.e. they do not influence PC's management to accept any random bids or even the first bid they receive.

4.6.3 Acquirer returns

In the previous sections, we establish that lead VC's exit choice does not hamper the PC or its shareholder. Here, we examine the same phenomena from acquirer's perspective. It can be argued that with better insider information, VC may try to sell a lemon to a strategic buyer. Buying a lemon should negatively affect an acquirer's market performance. Following the logic, we examine the acquirer's cumulative abnormal returns around the completed mergers. To do so, we use CRSP database to gather stock returns. Some of the acquisitions include non-US buyers. Thus, we lose some observations during our event study.

[Insert Table 23 About Here]

First, we conduct short-term event study using the merger announcement date. We estimate expected returns using Fama-French Carhart four-factor model on daily stock returns during -365 to -100 days of the event date and calculate CARs during -1 to +1 days of the event date. In Model 1, Table 23, we estimate industry fixed effects regression with the CARs as the dependent variable. We find that lead VC present dummy is significant at 10% level. Acquirers benefit from buying VC present companies in the short run.

In Model 2 and Model 3, we employ calendar time portfolio approach and BHAR methodology to conduct long-term event study and calculate abnormal returns for 13 months to 60 months period following the event month. Using these returns as dependent variable, we find no significance for our independent variable. Acquirers do not benefit in the long run by buying a public company where lead VC is present compared to the company where lead VC has already exited.

All of these results indicate that acquirers do not suffer by acquiring lead VC present companies. In other words, lead VC do not sell lemons to the strategic buyer and thus do not act opportunistically during their exit.

4.7 Conclusion

Even though we know that VCs retain significant portion of their holdings post-IPO, we have not fully examined how their exit strategy affects the PC's post-IPO life cycle. Gill and Walz (2016) find that compared to non-VC-backed IPOs, VC-backed IPOs have a higher probability of being taken over. However, we are not aware whether these mergers happen in the presence of lead VCs. We hand collect lead VC ownership from various SEC filings, identify whether lead VC is present during a merger, and examine whether lead VC presence affects the likelihood of a PC receiving M&A offers. We find that lead VC presence indeed increases the probability of a PC receiving takeover offers. However, just to facilitate their exit, they do not avoid the adoption of ATPs. Rather they encourage the use of ATPs and facilitate the long-term development of PCs. Besides, their activities do not harm the target or the acquirer. Their involvement helps increase the speed of the takeover and also helps demand higher takeover premium. Acquirers of VC present companies do not suffer in terms of the

market performance in the short or long run. In summary, lead VCs do not act opportunistically even during their divestment phase but rather care about the target stockholders and the portfolio company.

Our results provide additional evidence to the dual exit strategy as explained by Brau et al. (2010) and Mantecon and Thistle (2011), whereby we show that lead VCs play an active role in the post-IPO mergers. Additionally, our results are useful to the practitioners. Active investors may invest in public VC-backed companies and enjoy a higher premium during the PC's takeover. Further, because of the non-opportunistic nature of lead VCs, an active acquirer may benefit from buying a VC present company provided that there are other benefits via synergies between the acquirer and target businesses.

Chapter 5: Concluding remarks

VCs' pre-IPO involvement has been extensively examined. However, their involvement and their impact on corporate governance after an IPO remains relatively unexplored. To fill this gap in the literature, we hand collect ownership data from various SEC filings, and supplement the data with merger-related lawsuits from SCAC, SEC filings, Factiva and Lexis-Nexis. With this unique dataset, we examine how VCs 1) exit from their PCs, 2) influence the merger decision and related class-action lawsuits, and 3) affect the acquisition of VC-backed IPOs. On average, lead VCs stay invested for three years post-IPO. Rather than divesting right at the IPO, they use various exit mechanisms such as share distributions, continuous sales in the open market, and M&As to reduce their holdings post-IPO. Their choice of exit increases the probability of their PCs' getting acquired. But, to facilitate their exit, they do not act opportunistically. Their presence, instead, reduces merger-related litigation risk. In conclusion, we state that VCs' involvement post-IPO is almost as important as their involvement pre-IPO.

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Figures

Figure 1: Percentage of lead VC ownership post-IPO

This figure traces the level of lead VC ownership post-IPO against the number of years since the IPO. Lead VC ownership is measured in percentage terms. Mean lead VC ownership is represented by a solid line and median lead VC ownership is represented by a dotted line.

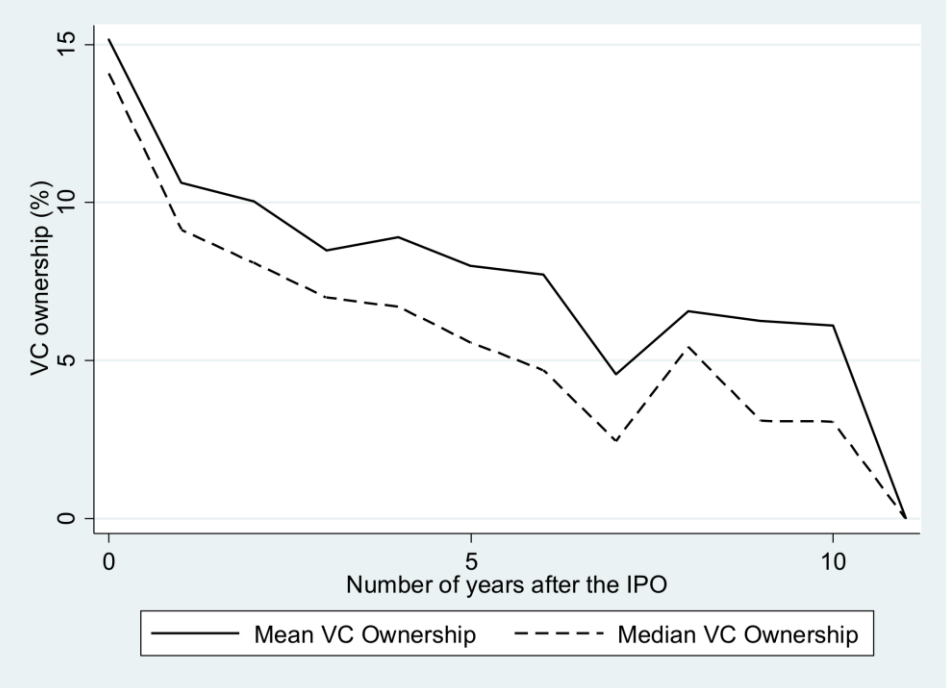


Figure 2: Mergers in VC-backed IPO companies

This figure outlines the possible IPO-to-merger timelines for our sample companies. Some of the companies are acquired in the presence of a lead VC while in others, the lead VC is already absent.

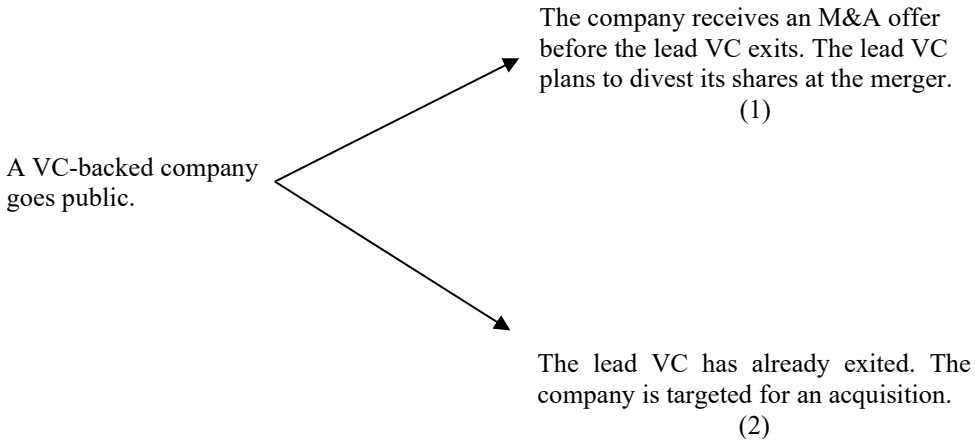


Figure 3: Mean cumulative abnormal returns around the merger date

This figure plots the mean cumulative abnormal returns during the period from -30 to +30 days around the merger announcement date (day 0) for all M&A offers in which the lead VC is either present or absent at the time of the takeover bid. Our event study sample includes 265 VC-present and 382 VC-absent M&As.

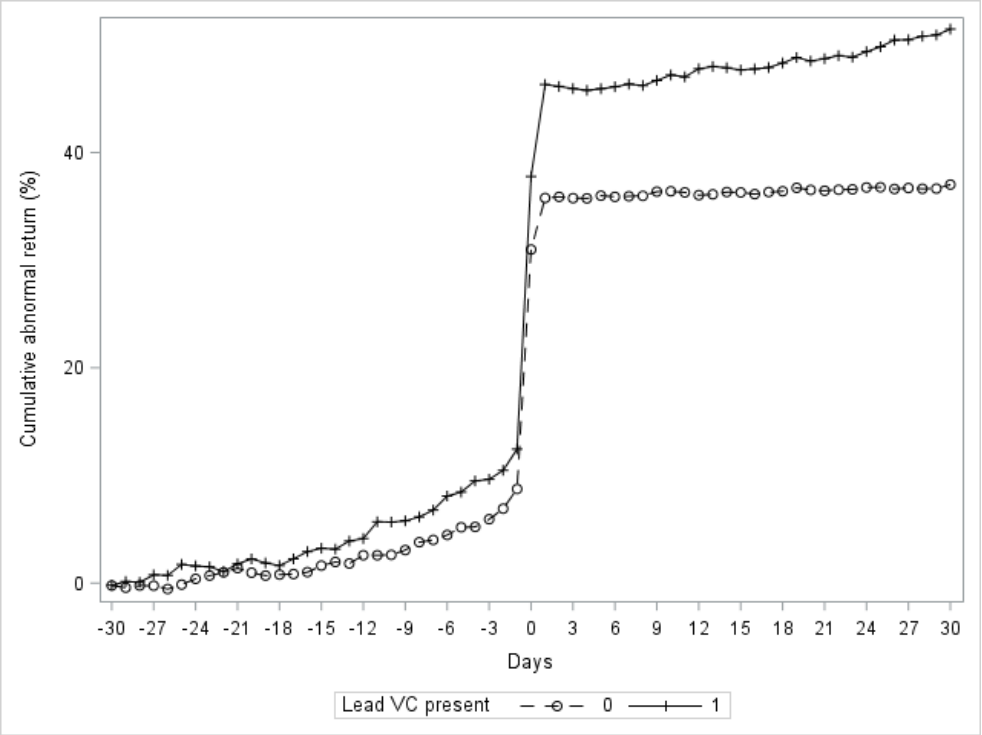
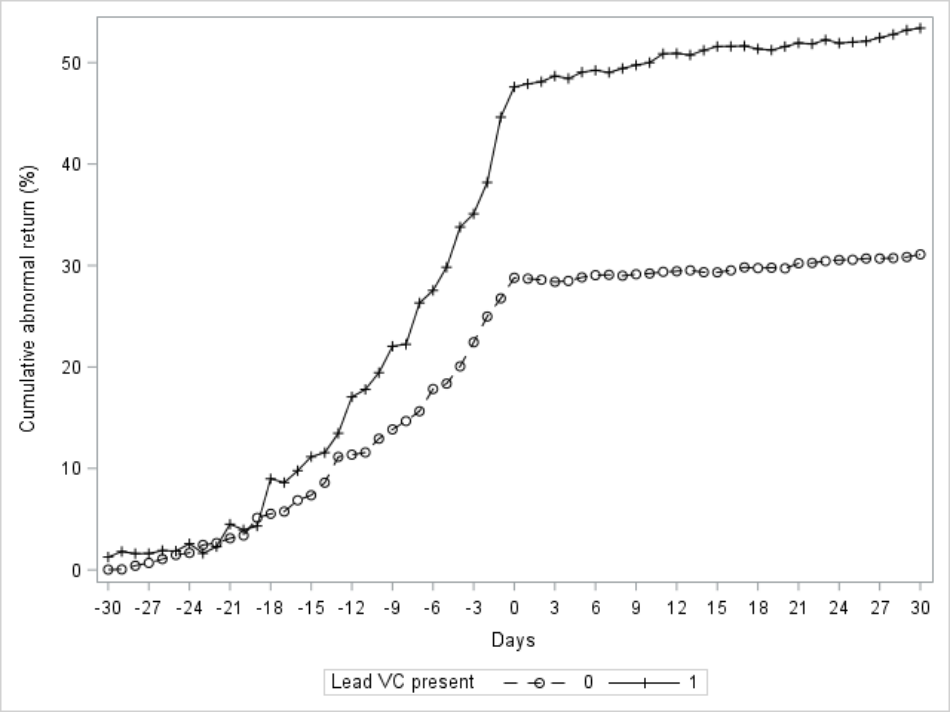


Figure 4: Mean cumulative abnormal returns around the litigation date

This figure plots the mean cumulative abnormal returns during the period from -30 to +30 days around the litigation date (day 0) for all our sample companies that faced merger-related litigation. Our sample includes 239 companies that were sued in connection with an M&A offer, of which 69 companies had the lead VC present at the time of the offer and 170 did not.



Tables

Table 1: Summary statistics

This table provides summary statistics for all independent and dependent variables that we use in our regressions. For each variable we report the number of non-missing observations, the mean, median, standard deviation, minimum, and maximum, respectively. Panel A provides summary statistics for all variables that we use in our exit time regression. Panel B includes summary statistics for all variables that we use in the lead VC ownership regression, and Panel C displays the lead VC ownership percentage figures before and after the IPO. N is the number of firms in Panels A and C, and the number of observations that we use in the lead VC ownership regression in Panel B. The number of firms/observations vary because of missing data for some of our portfolio companies (PCs) or venture capital (VC) characteristics in the SEC EDGAR, SDC, CRSP or Compustat databases.

	N	Mean	Median	St. Dev.	Min.	Max.
Panel A: Exit time regression variables						
Exit time (in years)	403	3.04	2.53	2.14	0.24	11.46
Investment period before the IPO (in years)	460	5.83	5.66	2.85	0.17	13.42
Lead VC age before the IPO (in years)	460	20.02	19.24	8.42	2.07	34.99
PC age before the IPO (in years)	460	9.15	7.96	4.55	1.25	27.3
No. of previous IPOs by the lead VC	460	41.8	22	49.33	1	202
No. of previous M&As by the lead VC	450	22.82	11	30.03	0	172
No. of rounds received by the company	460	6.87	7	3.43	1	23
Underpricing (%)	460	17.83	12.14	24.85	-20.83	101.19
% change in stock price: IPO to IPO+182 days	458	21.79	12.33	53.51	-62.75	215.18
% change in stock price: IPO+182 to IPO+365 days	455	1.45	-6.7	46.96	-77.42	184.54
Lead VC total known investment ($Mil)	457	26.08	20.26	20.5	0.52	116.5
No. of VCs invested in company	460	10.02	9	5.33	1	32
IPO size ($Mil)	460	88.52	75	57.68	7.7	380.4
IPO price ($)	460	12.81	12	4.63	5	42
Blockholder ownership at the IPO other than VC (%)	459	8.54	4.8	11.3	0	48.74
Panel B: Lead VC ownership regression variables						
Firm size ($Mil)	2964	247.62	114.2	1192.11	0.60	29262.71
Cash (ratio)	2304	0.41	0.36	0.26	0.01	0.98
Market to book value (ratio)	2462	1.44	1.39	0.80	0.04	3.84
Intangible assets (ratio)	2967	0.07	0	0.11	0	0.32
Leverage (ratio)	2967	0.41	0.02	1.30	0	10.11
Net sales/turnover (ratio)	2967	0.17	0.14	0.17	0	0.83
Capital expenditures (ratio)	2966	0.01	0.01	0.02	0	0.13
ROA (ratio)	2923	-0.06	-0.03	0.11	-0.57	0.16
ROE (ratio)	2923	-0.13	-0.04	0.44	-3.05	0.90
Average return (%)	2392	6.40	-1.83	60.26	-98.63	687.27
Average S&P500 return (%)	2861	3.45	3.41	12.02	-47.51	59.09
Excess S&P500 return (%)	2392	2.55	-5.13	56.91	-141.12	660.07
Panel C: Lead VC ownership post-IPO (in %)						
Before the IPO	461	21.28	19.80	12.05	0.11	89.40
Immediately after the IPO	462	16.08	15.00	9.43	0.09	68.90
1 year after the IPO	402	11.09	9.62	9.60	0.00	65.60
2 years after the IPO	280	10.32	8.30	9.57	0.00	66.30
3 years after the IPO	200	9.19	7.10	9.28	0.00	63.90
4 years after the IPO	124	9.07	6.80	9.55	0.00	62.50
5 years after the IPO	71	8.62	5.26	11.14	0.00	60.90

Table 2: Exit mechanisms

This table lists different exit mechanisms that lead VCs use to divest their holdings post-IPO in column one. Column two provides the number of lead VCs exiting their investments post-IPO via the different mechanisms listed in column one. Columns three and four provide the mean and median time (in years) that lead VCs take to exit and the total time (in years) spent by the lead VCs from the first financing round to the IPO date.

Exit mechanism	No. of lead VCs	Mean (median) exit time (Years)	Mean (median) investment period before the IPO (Years)
No exit	38	.	6.70
			(6.40)
Majority continuous sales (C Sales) in the open market	67	3.63	5.26
		(3.01)	(5.20)
Majority share distributions (SDs) to LPs	109	2.91	6.18
		(2.40)	(6.24)
Majority M&A	64	3.21	6.07
		(2.63)	(5.87)
Delisted (CRSP code 5)	18	.	5.63
			(4.95)
SEO (underwriter sales)	10	3.39	6.68
		(2.76)	(6.28)
Unknown	127	2.67	5.70
		(1.92)	(5.30)

Table 3: Descriptive statistics by exit mechanism

This table provides summary statistics, particularly the mean and median, for all the variables that we use in our exit time regressions. We list variable names in column one and report the mean (median) of share distributions (SDs), continuous sales in the open market (C Sales), and mergers (M&A) in columns two, three, and four, respectively. We employ t-tests and Kruskal-Wallis tests to test the mean and median differences between C Sales and SDs in column five and between C Sales and M&A in column six. We report p-values for the mean (median) differences in these columns.

	C Sales	SDs	M&A	Tests of differences (C Sales vs. SDs)	Tests of differences (C Sales vs. M&A)
Exit time	3.64	2.92	3.11	0.036	0.148
	(3.09)	(2.43)	(2.42)	(0.014)	(0.162)
Investment period before the IPO	5.23	6.17	6.00	0.039	0.122
	(5.14)	(6.24)	(5.85)	(0.037)	(0.127)
Lead VC age before the IPO	20.34	21.33	19.41	0.434	0.511
	(20.84)	(23.57)	(18.49)	(0.411)	(0.480)
PC age before the IPO	9.10	8.50	9.41	0.402	0.695
	(7.77)	(7.51)	(8.16)	(0.326)	(0.512)
No. of previous IPOs by the lead VC	39.58	52.31	38.77	0.092	0.920
	(24.00)	(31.50)	(18.00)	(0.209)	(0.642)
No. of previous M&As by the lead VC	18.28	27.26	26.25	0.027	0.130
	(11.00)	(14.00)	(12.00)	(0.112)	(0.483)
No. of rounds received by the company	6.80	6.12	6.81	0.199	0.989
	(6.50)	(6.00)	(6.00)	(0.405)	(0.981)
Underpricing	17.19	19.20	16.64	0.595	0.884
	(12.14)	(12.38)	(12.00)	(0.929)	(0.650)
% change in stock price: IPO to IPO+182 days	38.76	28.34	14.62	0.250	0.016
	(32.00)	(22.64)	(5.94)	(0.338)	(0.010)
Lead VC ownership at the IPO	15.20	18.95	18.92	0.002	0.012
	(13.85)	(18.30)	(17.70)	(0.001)	(0.022)
No. of VCs invested in the company	9.71	8.78	10.19	0.205	0.591
	(9.00)	(8.00)	(9.00)	(0.187)	(0.833)
IPO size	4.32	4.35	4.26	0.796	0.418
	(4.42)	(4.33)	(4.22)	(0.774)	(0.160)
Blockholder ownership at the IPO other than VC	9.91	6.59	6.40	0.087	0.071
	(4.10)	(0.00)	(5.33)	(0.238)	(0.496)
IPO multiplier	3.61	4.75	4.17	0.305	0.719
	(2.15)	(3.04)	(2.35)	(0.003)	(0.632)
No. of observations	67	109	64		

Table 4: Exit time regressions

We run industry fixed-effects (based on the Fama and French 48 industry classification) regressions in Models 1 to 4, and a Weibull parametric regression in Model 5 to explore the determinants of a lead VC's exit time and the speed of exit post-IPO, respectively. We measure exit time as the difference in years between the IPO date and the time when lead VC ownership becomes zero. All independent variables are described in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted and clustered at the industry level. P-values are included in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
VC characteristics					
Investment period before the IPO	-0.154**			-0.158***	0.098***
	(0.015)			(0.000)	(0.000)
Lead VC age before the IPO	-0.033***			-0.032***	0.018***
	(0.001)			(0.010)	(0.008)
No. of previous IPOs by the lead VC	0.008***			0.008***	-0.004***
	(0.001)			(0.001)	(0.006)
PC/IPO characteristics					
PC age before the IPO		-0.093***		-0.036	0.023*
		(0.006)		(0.180)	(0.063)
No. of rounds received by the company		0.042		0.096**	-0.066***
		(0.366)		(0.019)	(0.006)
% change in the stock price: IPO to IPO+182 days		-0.008***		-0.009***	0.005***
		(0.000)		(0.000)	(0.000)
BOD characteristics					
Lead VC in audit committee at the IPO			0.180	0.174	-0.264***
			(0.460)	(0.245)	(0.001)
Lead VC in compensation committee at the IPO			0.646***	0.594***	-0.318***
			(0.005)	(0.004)	(0.000)
Lead VC in governance committee at the IPO			0.278	0.224	-0.160
			(0.315)	(0.324)	(0.113)
Controls					
Lead VC ownership at the IPO	0.067***	0.060***	0.058**	0.056***	-0.032***
	(0.002)	(0.002)	(0.017)	(0.001)	(0.000)
Lead VC total known investment	0.227	0.211	0.193	0.118	-0.157
	(0.316)	(0.315)	(0.230)	(0.651)	(0.165)
Investment preference later stage	-0.342	-0.598	-0.541	-0.488	0.052
	(0.413)	(0.183)	(0.237)	(0.245)	(0.790)
High tech dummy	0.258	0.259	0.061	0.237	-0.002
	(0.265)	(0.274)	(0.822)	(0.436)	(0.990)
No. of VCs invested in the company	0.053*	0.012	0.035	0.014	-0.017
	(0.072)	(0.748)	(0.285)	(0.669)	(0.339)
IPO size	-0.265	-0.193	-0.049	-0.298*	0.436***
	(0.187)	(0.234)	(0.797)	(0.062)	(0.000)
Blockholder ownership at the IPO other than VC	0.016***	0.026***	0.020***	0.018**	-0.013***
	(0.002)	(0.002)	(0.002)	(0.011)	(0.000)
IPO multiplier	0.020	0.035	0.015	0.020	-0.023**
	(0.588)	(0.267)	(0.658)	(0.565)	(0.014)
Underpricing	-0.011**	-0.008	-0.011*	-0.006	0.004*
	(0.042)	(0.111)	(0.060)	(0.150)	(0.073)
Constant	1.384	1.122	-0.475	2.487	-2.055**
	(0.403)	(0.498)	(0.745)	(0.255)	(0.045)
Industry fixed-effects	Yes	Yes	Yes	Yes	No
No. of observations	400	399	400	399	399
Adjusted R^2 /Pseudo R^2	0.182	0.188	0.145	0.263	
Weibull parameter					1.848

Table 5: Lead VC ownership post-IPO

We estimate a series of fractional logit firm fixed effects regressions to examine the relation between firm performance and post-IPO lead VC fractional ownership. We collect ownership data from proxy filings and Form 4 filings available on the SEC EDGAR website. All variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted and clustered at the firm level. P-values are included in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
ROA	1.609***			
	(0.000)			
ROE		0.061		
		(0.237)		
Average return			-0.611***	
			(0.003)	
Average S&P500 return			-0.725	
			(0.233)	
Excess S&P500 return				-0.643***
				(0.001)
Controls				
Lag lead VC ownership	7.636***	7.958***	7.625***	7.647***
	(0.000)	(0.000)	(0.000)	(0.000)
Firm size	-0.110*	0.018	-0.077	-0.072
	(0.072)	(0.752)	(0.176)	(0.198)
Cash	0.254**	0.334***	0.337***	0.336***
	(0.010)	(0.000)	(0.001)	(0.001)
MTB	-0.065**	-0.066**	-0.047*	-0.053**
	(0.016)	(0.017)	(0.061)	(0.034)
Intangible assets	-0.283	-0.221	-0.189	-0.193
	(0.388)	(0.519)	(0.556)	(0.552)
Leverage	0.011	0.015	-0.002	-0.001
	(0.245)	(0.154)	(0.815)	(0.922)
Net sales/turnover	-1.018***	-0.438**	-0.418**	-0.432**
	(0.000)	(0.016)	(0.020)	(0.019)
Capital expenditures	3.099**	2.620*	1.908	2.179
	(0.032)	(0.059)	(0.152)	(0.102)
Constant	-2.040***	-2.987***	-2.483***	-2.507***
	(0.000)	(0.000)	(0.000)	(0.000)
Firm fixed-effects	Yes	Yes	Yes	Yes
No. of observations	1,966	1,966	1,912	1,912
Pseudo R^2	0.106	0.106	0.107	0.107

Table 6: Exit mechanism logit regressions

We estimate a series of logit regressions to predict the influence of various covariates on a VC firm's choice of exit mechanism. We focus on majority share distributions, majority continuous sales, and majority M&A as the three main exit mechanisms, and run binomial logit regressions to predict their likelihood in Models 1, 2, and 3, respectively. In addition, we estimate a multinomial logit regression model to predict the likelihood of a majority share distribution or majority M&A in Model 4, with majority continuous sales as the baseline comparison group. All variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted clustered at the industry level. P-values are included in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Binomial models			Multinomial model	
	(1) C Sales	(2) SDs	(3) M&A	(4) SDs	(4) M&A
VC characteristics					
Investment period before the IPO	-0.117***	0.215**	-0.013	0.236**	0.068
	(0.000)	(0.017)	(0.622)	(0.016)	(0.450)
Lead VC age before the IPO	0.038*	0.017	-0.053***	-0.043	-0.071**
	(0.052)	(0.505)	(0.000)	(0.187)	(0.041)
No. of previous IPOs by the lead VC	-0.007**	0.003		0.007	0.001
	(0.037)	(0.190)		(0.134)	(0.857)
No of previous M&As by the lead VC			0.012**	0.016*	0.029***
			(0.042)	(0.092)	(0.005)
PC/IPO characteristics					
PC age before the IPO	0.048**	-0.179**	0.061*	-0.114	0.011
	(0.019)	(0.045)	(0.075)	(0.110)	(0.843)
No. of rounds received by the company	0.039	-0.085**	-0.051	-0.087	-0.054
	(0.359)	(0.030)	(0.390)	(0.198)	(0.496)
% change in stock price: IPO to IPO+182 days	0.007***	0.003	-0.008	-0.005	-0.012***
	(0.000)	(0.104)	(0.115)	(0.164)	(0.009)
Controls					
Lead VC ownership at the IPO	0.007	0.044***	0.066***	0.054*	0.071**
	(0.665)	(0.000)	(0.000)	(0.075)	(0.024)
High tech dummy	0.438	0.266	0.135	-0.430	-0.216
	(0.345)	(0.487)	(0.551)	(0.462)	(0.741)
No. of VCs invested in the company	-0.016	-0.027	0.015	-0.028	0.047
	(0.418)	(0.532)	(0.741)	(0.624)	(0.396)
IPO size	0.202	-0.245	-0.333	-0.236	-0.634
	(0.212)	(0.496)	(0.143)	(0.575)	(0.143)
Blockholder ownership at the IPO other than VC	0.007	-0.018	-0.027***	-0.020	-0.016
	(0.797)	(0.154)	(0.001)	(0.228)	(0.390)
IPO multiplier	-0.005	0.070**	-0.097***	0.007	0.014
	(0.823)	(0.022)	(0.002)	(0.809)	(0.687)
Underpricing	-0.005	-0.007	0.004	0.003	0.005
	(0.525)	(0.146)	(0.528)	(0.758)	(0.580)
Constant				1.906	2.239
				(0.392)	(0.316)
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes
No. of observations	399	399	390	237	
Pseudo R^2	0.049	0.113	0.076	0.113	

Table 7: Quantile regressions to predict exit time and lead VC ownership post-IPO

We estimate three quantile regressions to check whether our results hold true for the 25th, 50th, and 75th quantiles of our sample. Panel A includes quantile regressions for exit time and Panel B includes quantile regressions for lead VC ownership post-IPO. All variables are defined in Appendix 1. P-values are included in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: Exit time regressions			
	(1) Q(0.25) FE	(2) Q(0.50) FE	(3) Q(0.75) FE
VC characteristics			
Investment period before the IPO	-0.058*	-0.119***	-0.148**
	(0.064)	(0.005)	(0.011)
Lead VC age before the IPO	-0.020*	-0.024*	-0.049***
	(0.056)	(0.068)	(0.006)
No. of previous IPOs by the lead VC	0.005***	0.006*	0.008***
	(0.000)	(0.050)	(0.005)
PC/IPO characteristics			
PC age before the IPO	-0.042**	-0.010	-0.054
	(0.025)	(0.667)	(0.138)
No. of rounds received by the company	0.082**	0.119**	0.152***
	(0.022)	(0.021)	(0.004)
% change in stock price: IPO to IPO+182 days	-0.005***	-0.006***	-0.012***
	(0.000)	(0.001)	(0.000)
BOD characteristics			
Lead VC in audit committee at the IPO	0.039	0.259	-0.031
	(0.832)	(0.272)	(0.892)
Lead VC in compensation committee at the IPO	0.360**	0.480**	1.003***
	(0.010)	(0.041)	(0.000)
Lead VC in governance committee at the IPO	0.098	0.188	0.229
	(0.472)	(0.395)	(0.346)
Controls			
Lead VC ownership at the IPO	0.045***	0.065***	0.061***
	(0.000)	(0.000)	(0.002)
Lead VC total known investment	-0.057	-0.183	0.228
	(0.693)	(0.338)	(0.444)
Investment preference later stage	-0.234	-0.189	0.210
	(0.321)	(0.650)	(0.642)
High tech dummy	0.333	0.107	-0.088
	(0.142)	(0.707)	(0.790)
No. of VCs invested in company	-0.008	-0.003	-0.004
	(0.665)	(0.908)	(0.893)
IPO size	-0.083	-0.080	-0.560
	(0.660)	(0.772)	(0.158)
Blockholder ownership at the IPO other than VC	0.010	0.020	0.030***
	(0.129)	(0.128)	(0.002)
IPO multiplier	-0.004	-0.012	0.014
	(0.877)	(0.773)	(0.844)
Underpricing	-0.008***	-0.003	-0.006*
	(0.004)	(0.540)	(0.071)
Constant	6.502	6.877	6.074
	(0.411)	(0.264)	(0.490)
Industry fixed-effects	Yes	Yes	Yes
No. of observations	399	399	399
Pseudo R^2	0.155	0.202	0.276

Panel B: Lead VC ownership regressions			
	(1) Q(0.25) FE	(2) Q(0.50) FE	(3) Q(0.75) FE
Average return	-0.048***	-0.028***	-0.004**
	(0.000)	(0.000)	(0.049)
Average S&P500 return	-0.151***	-0.022	-0.008*
	(0.005)	(0.294)	(0.086)
Controls			
Lagged lead VC ownership	0.900***	0.978***	0.995***
	(0.000)	(0.000)	(0.000)
Firm size	0.001	-0.002**	-0.000
	(0.383)	(0.030)	(0.128)
Cash	0.000	-0.002	0.000
	(0.924)	(0.482)	(0.637)
MTB	-0.006***	-0.006***	-0.001***
	(0.000)	(0.000)	(0.000)
Intangible assets	-0.032**	-0.006	-0.000
	(0.019)	(0.272)	(0.940)
Leverage	0.001*	0.001***	0.000**
	(0.057)	(0.003)	(0.031)
Net sales/turnover	0.001	0.016***	0.003***
	(0.949)	(0.001)	(0.008)
Capital expenditures	-0.010	0.033	0.029***
	(0.902)	(0.470)	(0.000)
Constant	-0.036	0.005	0.001
	(0.707)	(0.662)	(0.427)
Firm fixed-effects	Yes	Yes	Yes
No. of observations	1,907	1,907	1,907
Pseudo R^2	0.487	0.661	0.775

Table 8: Distribution of sample companies across years and industries

The sample consists of 1,559 VC-backed IPOs between 1996 and 2014. This table provides a sample breakdown by year and lists (1) the number of VC-backed IPOs, (2) IPOs that received M&A offers, and (3) M&A offers that become subject to litigation.

Year	No. of VC-backed IPOs	No. of M&A takeover bids	No. of litigated mergers
1996	235	115	22
1997	135	67	17
1998	74	40	14
1999	255	140	41
2000	228	124	33
2001	34	19	7
2002	23	15	8
2003	22	8	4
2004	78	35	17
2005	45	13	7
2006	54	15	8
2007	77	39	24
2008	7	4	3
2009	11	2	2
2010	40	12	8
2011	37	13	9
2012	45	20	17
2013	64	8	6
2014	95	8	5
Total	1,559	697	252

Table 9: Descriptive statistics

This table provides summary statistics for all independent and dependent variables used in our analysis. The columns include the variable name, the number of non-missing observations, and the mean, median, standard deviation, minimum, and maximum, respectively. All variables are defined in Appendix 1.

	N	Mean	Median	St. Dev.	Min	Max
Litigation dummy	697	0.36	0.00	0.48	0.00	1.00
Lead VC present dummy	697	0.43	0.00	0.50	0.00	1.00
Takeover premium (ratio)	697	0.52	0.42	0.49	-0.82	3.47
Lead VC age (yrs)	299	18.18	18.86	7.40	2.53	37.36
No. of previous IPOs by lead VC	299	40.23	22.00	44.63	1.00	197.00
No. of previous M&As by lead VC	278	11.56	2.00	23.73	0.00	164.00
First M&A by lead VC dummy	278	0.27	0.00	0.44	0.00	1.00
Investment period before IPO (yrs)	291	3.55	2.89	2.67	0.12	14.95
No. of institutional blockholders	687	2.24	2.00	1.80	0.00	8.00
Value of the transaction ($ billion)	697	0.98	0.30	1.82	0.00	22.28
Multiple bidders dummy	697	0.06	0.00	0.24	0.00	1.00
Tender offer dummy	697	0.28	0.00	0.45	0.00	1.00
Termination agreement dummy	697	0.83	1.00	0.37	0.00	1.00
Intra-industry merger dummy	697	0.61	1.00	0.49	0.00	1.00
Total assets (ln)	692	4.95	4.84	1.31	0.50	9.87
Long-term debt ratio	672	0.10	0.00	0.19	0.00	1.39
Market to book ratio	692	3.13	2.38	2.33	0.56	7.77
R&D expenses ratio	692	0.04	0.03	0.05	0.00	0.37
Sales growth (%)	681	3.78	2.51	18.89	-32.15	48.50
PE ratio	682	10.23	-7.58	99.02	-139.00	200.13
Financial trouble dummy	675	0.45	0.00	0.50	0.00	1.00
Price runup	697	0.07	0.04	0.23	-0.34	0.62
All stock dummy	697	0.24	0.00	0.43	0.00	1.00
All cash dummy	697	0.60	1.00	0.49	0.00	1.00

Table 10: Univariate tests

This table differentiates between M&A offer for VC-backed IPO companies in which the lead VC was either present or absent and provides summary statistics, particularly the mean and the median, for each subsample. We list the variable names in column one and report the means (medians) in columns two and three for each subsample, respectively. We employ t-tests and Kruskal-Wallis tests to test the mean and median differences between our VC present and VC absent samples and report the respective p-values in column four.

	Lead VC present Mean (Median)	Lead VC absent Mean (Median)	Tests of differences Mean (Median)
No. of institutional blockholders	1.57	2.72	**0.000**
	(1.00)	(3.00)	**(0.000)**
Takeover premium	0.59	0.47	**0.002**
	(0.50)	(0.38)	**(0.000)**
Value of the transaction ($ billion)	0.75	1.15	**0.002**
	(0.22)	(0.36)	**(0.000)**
All cash dummy	0.52	0.66	**0.000**
	(1.00)	(1.00)	**(0.002)**
Total assets (log)	4.59	5.21	**0.000**
	(4.50)	(5.14)	**(0.000)**
Long-term debt ratio	0.09	0.10	0.272
	(0.00)	(0.00)	(0.315)
Market to book ratio	3.17	3.09	0.660
	(2.38)	(2.38)	(0.622)
Financial trouble dummy	0.46	0.45	0.792
	(0.00)	(0.00)	(0.933)
CAR around merger date (-1,1) (%)	35.28	28.04	**0.015**
	(28.90)	(22.74)	**(0.056)**
CAR around litigation date (-1,1) (%)	10.83	4.00	**0.042**
	(1.10)	(0.44)	(0.136)

Table 11: The effect of a lead VC's presence on M&A litigation risk

We estimate a series of logit regressions to examine the effect of the lead VC's presence during an M&A offer on the target company's merger related risk of litigation. The dependent variable is the probability that a VC-backed IPO which receives an M&A offer faces a merger-related lawsuit. The independent variable l*ead VC present* is a dummy variable that equals one if the lead VC is present during an M&A offer, i.e., the lead VC has not exited from the company. In Model 1, we include the lead VC present dummy and all control variables. In Model 2, we control for the number of blockholders. In Model 3, we classify blockholders based on Thompson One's 13f classification, i.e., we differentiate between banks, insurance companies, investment advisors, investment companies, and others. The two latter categories are excluded because IPOs with investment companies as blockholders had no M&A-related litigation, and the "other" category serves as a benchmark. All variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted and p-values are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)
Lead VC present	-0.745***	-0.513**	-0.679***
	(0.000)	(0.010)	(0.001)
No. of institutional blockholders		0.290***	
		(0.000)	
Banks			0.255
			(0.563)
Insurance companies			-0.505
			(0.363)
Investment advisors			0.895***
			(0.000)
Value of the transaction	0.184***	0.135***	0.137***
	(0.000)	(0.007)	(0.008)
Multiple bidders dummy	-0.118	-0.111	-0.206
	(0.765)	(0.787)	(0.628)
All cash	1.183***	1.032***	0.957***
	(0.000)	(0.000)	(0.000)
Tender offer dummy	-0.235	-0.370	-0.250
	(0.285)	(0.105)	(0.293)
Termination agreement dummy	0.686**	0.742***	0.617**
	(0.011)	(0.007)	(0.035)
Intra-industry merger dummy	-0.326*	-0.284	-0.357*
	(0.086)	(0.144)	(0.094)
Constant	-1.085	-2.043**	-1.653**
	(0.181)	(0.025)	(0.046)
Industry fixed-effects	Yes	Yes	Yes
No. of observations	682	673	545
Pseudo R^2	0.120	0.155	0.134
P-value (χ^2 test)	0.000	0.000	0.000

Table 12: Robustness tests

We estimate a series of logit regressions to ensure that our results are not biased. In Model 1, we employ a propensity score matching routine in which we match lead VC-present M&A offers with lead VC-absent M&A offers based on firm size, MTB, and industry (Fama French 48-industry classification). In Model 2, we employ a special regressor estimation method to accommodate for any endogeneity between lead VC present and litigation risk. In Models 3 and 4, we employ a standard IV method whereby first we estimate the presence of lead VC and then use the estimated coefficient to predict the probability of a lawsuit filing. All variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted and p-values are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1) Litigation (PSM)	(2) Litigation	(3) Lead VC present	(4) Litigation
Lead VC present	-0.692***	-1.641**		-1.568***
	(0.001)	(0.026)		(0.000)
PC age			-0.019***	
			(0.000)	
Price change IPO to IPO+180 days			-0.038***	
			(0.000)	
No. of institutional blockholders	0.329***	-0.074	-0.054***	0.015
	(0.000)	(0.360)	(0.000)	(0.703)
Value of the transaction	0.069	-0.320***	-0.013	0.054*
	(0.274)	(0.000)	(0.153)	(0.083)
Multiple bidders dummy	-0.257	0.684	0.111	0.078
	(0.574)	(0.111)	(0.107)	(0.726)
All cash	1.070***	0.457*	-0.059	0.330**
	(0.000)	(0.059)	(0.159)	(0.016)
Tender offer dummy	-0.457*	-0.146	0.094**	-0.002
	(0.086)	(0.559)	(0.026)	(0.988)
Termination agreement dummy	0.514*	-0.050	0.005	0.276**
	(0.091)	(0.848)	(0.909)	(0.049)
Intra-industry merger dummy	0.041	0.059	0.022	-0.062
	(0.847)	(0.779)	(0.554)	(0.575)
Constant	-2.821***	0.663	0.874***	-0.251
	(0.000)	(0.235)	(0.000)	(0.602)
Industry fixed-effects	Yes	Yes	Yes	Yes
No. of observations	598	653	655	655
Pseudo R^2	0.160			
P-value (χ^2 test)	0.000	0.000	0.000	0.000

Table 13: Additional tests

We conduct additional tests to further ensure the consistency of our results. In Model 1, we replace lead VC presence with lead VC board position. To control for the endogeneity problem, we use special regressor method in Model 2 and standard IV regression in Model 3 and 4. We use PC age and stock price change during the first 182 days of going public as two instrument variables predicting the presence of lead VC. In Model 5, we replace lead VC presence with the ownership of lead VC right before the M&A offer. Finally, in Model 6, we limit our M&A offers to only include completed offers. All variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted and p-values are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1) Litigation	(2) Litigation	(3) Lead VC in BOD	(4) Litigation	(5) Litigation	(6) Litigation
Lead VC in board	-0.578***	-1.624**		-1.673***		
	(0.004)	(0.031)		(0.000)		
PC age			-0.018***			
			(0.000)			
Price change IPO to IPO+182 days			-0.034***			
			(0.000)			
Lead VC ownership					-0.025**	
					(0.048)	
Lead VC present						-0.624***
						(0.002)
No. of institutional blockholders	0.274***	-0.100	-0.046***	0.017	0.287***	0.278***
	(0.000)	(0.182)	(0.000)	(0.671)	(0.000)	(0.000)
Value of the transaction	0.145***	-0.305***	-0.004	0.064**	0.136***	0.140***
	(0.004)	(0.000)	(0.668)	(0.036)	(0.006)	(0.005)
Multiple bidders dummy	-0.146	0.199	0.134*	0.132	-0.179	-0.515
	(0.721)	(0.623)	(0.068)	(0.565)	(0.655)	(0.321)
All cash	0.938***	0.752***	-0.039	0.306**	0.949***	1.052***
	(0.000)	(0.001)	(0.356)	(0.025)	(0.000)	(0.000)
Tender offer dummy	-0.314	-0.064	0.077*	-0.000	-0.319	-0.302
	(0.170)	(0.776)	(0.069)	(0.997)	(0.164)	(0.195)
Termination agreement dummy	0.634**	-0.053	-0.005	0.227	0.672**	0.261
	(0.018)	(0.827)	(0.921)	(0.110)	(0.011)	(0.353)
Intra-industry merger dummy	-0.254	0.135	0.023	-0.065	-0.287	-0.282
	(0.184)	(0.480)	(0.550)	(0.554)	(0.131)	(0.150)
Constant	-1.877**	0.401	0.781***	-0.220	-1.974**	-1.364
	(0.035)	(0.417)	(0.000)	(0.643)	(0.026)	(0.119)
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	671	612	632	632	671	636
Pseudo R^2	0.145				0.141	0.158
P-value	0.000	0.000	0.000	0.000	0.000	0.000

Table 14: Predicting takeover premiums and M&A related litigation risk

We estimate a series of industry fixed effects regressions to examine whether the presence of a lead VC at the time a company receives an M&A offer affects the company's takeover premium. The dependent variable in Models 1 to 3 is the takeover premium. In Model 4, the dependent variable is the probability that a company faces a merger-related lawsuit. The independent variable *lead VC present* is a dummy variable that equals one if the lead VC is present during an M&A offer, i.e., the lead VC has not exited from the company. In Model 1, we include the lead *VC present dummy* and all control variables. In Model 2, we control for the number of blockholders. In Model 3, we employ a propensity score matching routine in which we match lead VC present M&A offers with lead VC absent M&A offers based on firm size, MTB, and industry (Fama French 48-industry classification). In Model 4, we use the predicted premium from Model 3 to test whether the takeover premium due to the lead VC affects the company's litigation risk. All variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted and p-values are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3) PSM sample 1st stage	(4) PSM sample 2nd stage
Dependent variable ⟶	Premium	Premium	Premium	Litigation
Lead VC present	0.095**	0.078*	0.099**	
	(0.027)	(0.083)	(0.039)	
No. of institutional blockholders		-0.023*	-0.007	0.250***
		(0.084)	(0.669)	(0.000)
Total assets	-0.055***	-0.043**	-0.040	
	(0.006)	(0.030)	(0.152)	
Long-term debt	0.028	0.047	0.015	
	(0.839)	(0.732)	(0.904)	
Market to book ratio	-0.003	-0.001	0.009	
	(0.730)	(0.913)	(0.271)	
R&D expenses	-0.538	-0.463	-0.334	
	(0.385)	(0.494)	(0.624)	
Sales growth	0.018	0.010	0.000	
	(0.800)	(0.887)	(1.000)	
PE ratio	-0.000	-0.000	-0.000	
	(0.950)	(0.990)	(0.535)	
Financial trouble dummy	-0.004	-0.006	-0.050	
	(0.933)	(0.902)	(0.353)	
Price runup	0.493***	0.485***	0.482***	
	(0.000)	(0.000)	(0.000)	
No. of bidders	0.112	0.081	0.216*	0.604
	(0.232)	(0.334)	(0.058)	(0.148)
Intra-industry merger dummy	0.019	0.019	-0.033	-0.274
	(0.627)	(0.628)	(0.482)	(0.169)
All stock dummy	-0.016	-0.024	0.031	
	(0.789)	(0.696)	(0.646)	
All cash dummy	0.121**	0.127**	0.166***	1.421***
	(0.017)	(0.013)	(0.008)	(0.000)
Value of the transaction				0.175***
				(0.002)
Tender offer dummy				-0.352
				(0.142)
Termination agreement dummy				0.816***
				(0.004)
Predicted premium				-2.320***
				(0.000)
Constant	0.541***	0.559***	0.353*	-1.864*
	(0.001)	(0.001)	(0.075)	(0.078)
Industry fixed-effects	Yes	Yes	Yes	Yes
No. of observations	637	629	522	522
Adjusted R^2/Pseudo R^2	0.112	0.112	0.137	0.166
P-value (F test/χ^2 test)	0.000	0.000	0.000	0.000

Table 15: The effect of the lead VC's characteristics on a company's M&A related litigation risk

We estimate a series of logit regressions to examine whether a lead VC's characteristics affect a target company's merger-related litigation risk in a sample of M&A offers for recent IPOs in which the lead VCs are still present. The dependent variable is the probability that an M&A target company faces a merger-related lawsuit. *Lead VC age* is the age of the VC at the time of the merger announcement. The *number of previous IPOs by the lead VC* is the total number of IPOs previously backed by the lead VC. The n*umber of previous M&As by the lead VC* is the total number of M&A exits by the lead VC. *First M&A by lead VC* is a dummy variable that is equal to one if the lead VC has not previously exited via an M&A. *Investment period before the IPO* is the difference between the date when the lead VC made its first investment in the company and the IPO date. All variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted and p-values are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Lead VC age	0.082***				
	(0.001)				
No. of previous M&As by lead VC		0.032***			
		(0.000)			
No. of previous IPOs by lead VC			0.003		
			(0.434)		
First M&A by lead VC dummy				-1.384**	
				(0.011)	
Investment period before the IPO					0.165***
					(0.009)
No. of institutional blockholders	0.248**	0.259**	0.336***	0.313**	0.261**
	(0.050)	(0.038)	(0.005)	(0.011)	(0.049)
Value of the transaction	0.011	-0.033	0.044	0.030	0.089
	(0.916)	(0.781)	(0.643)	(0.765)	(0.389)
Multiple bidders dummy	-0.298	-0.475	-0.129	-0.268	0.138
	(0.670)	(0.584)	(0.861)	(0.699)	(0.847)
All cash dummy	1.394***	1.302***	1.477***	1.258***	1.316***
	(0.002)	(0.007)	(0.001)	(0.007)	(0.005)
Tender offer dummy	-0.562	-0.718	-0.549	-0.474	-0.455
	(0.223)	(0.149)	(0.224)	(0.292)	(0.326)
Termination agreement dummy	0.744	0.529	0.672	0.616	0.679
	(0.101)	(0.283)	(0.154)	(0.216)	(0.150)
Intra-industry merger dummy	-0.405	-0.559	-0.496	-0.566	-0.530
	(0.250)	(0.116)	(0.142)	(0.108)	(0.130)
Constant	-2.302	-0.774	-1.800	-1.193	-2.120
	(0.151)	(0.658)	(0.272)	(0.474)	(0.204)
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes
No. of observations	277	259	277	259	269
Pseudo R^2	0.209	0.234	0.173	0.201	0.200
P-value (χ^2 test)	0.000	0.001	0.001	0.007	0.000

Table 16: Cumulative abnormal returns around the merger and litigation dates

We conduct a series of event studies around the merger and litigation dates. We report the mean cumulative abnormal returns (CARs) over selected event windows in Panel A. Day 0 refers to the event date. We include the mean CAR of the VC present (VC absent) sample in column two (four), its standardized cross-sectional test statistic (Z) in column three (five) and p-values for a test of mean differences in column six. We include similar statistics for litigation dates in columns seven to eleven. In Panel B, we regress the three-day CAR (-1, +1) around the merger and first litigation dates against the lead VC present dummy and several control variables. Our main explanatory variable in Model 1 is the l*ead VC present dummy*, accompanied by the *takeover premium* in Model 2. In Model 3, we match companies in which the lead VC is present during the M&A offer with companies from which the lead VC has already exited based on firm size, MTB and Fama-French 48-industry classification and run a similar regression as in Model 2. We do the same in Models 4 to 6, respectively for CARs around the litigation date. All variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted and p-values are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: Event study results

	Around the merger date					Around the litigation date				
	VC present (265)		VC absent (382)			VC present (69)		VC absent (170)		
Event windows	Mean	Z	Mean	Z	Diff	Mean	Z	Mean	Z	Diff
(-10, -2)	5.18%	**4.70**	4.71%	**6.98**	0.725	20.75%	**5.46**	12.88%	**8.19**	**0.054**
(-1, 1)	35.28%	**15.07**	28.04%	**19.65**	**0.015**	10.83%	**3.41**	4.00%	**4.36**	**0.042**
(0, 0)	24.87%	**11.46**	21.05%	**15.10**	0.168	3.31%	**2.02**	2.22%	**2.89**	0.582
(1, 5)	8.54%	**5.82**	5.59%	**6.88**	**0.100**	1.59%	**2.06**	0.20%	-0.16	**0.069**
(1, 15)	9.79%	**6.13**	5.97%	**6.87**	**0.066**	4.11%	**2.41**	0.84%	0.03	**0.019**

Panel B: CAR regressions

	Around the merger date		Around the merger date	
	(1)	(2) PSM	(3)	(4) PSM
Lead VC present	0.058*	0.087***	0.057*	0.082*
	(0.061)	(0.005)	(0.080)	(0.081)
Market value of equity	-0.058***	-0.035***	0.003	-0.002
	(0.000)	(0.007)	(0.772)	(0.919)
MTB	0.001	0.004	-0.009	-0.019
	(0.744)	(0.344)	(0.136)	(0.256)
Tender offer dummy	0.106***	0.086*	0.027	0.044
	(0.006)	(0.066)	(0.344)	(0.306)
Intra-industry merger dummy	-0.023	-0.046	0.009	0.124**
	(0.414)	(0.164)	(0.737)	(0.044)
Multiple bidders dummy	-0.085*	-0.052	-0.060*	-0.090
	(0.080)	(0.420)	(0.095)	(0.122)
Hostile offer dummy	-0.134	0.094	-0.081	
	(0.461)	(0.645)	(0.403)	
All stock dummy	-0.153***	-0.169***	-0.059	-0.214**
	(0.000)	(0.000)	(0.218)	(0.037)
Constant	0.701***	0.044	0.042	-0.014
	(0.000)	(0.674)	(0.278)	(0.837)
Industry fixed-effects	Yes	Yes	Yes	Yes
No. of observations	642	528	238	132
Adjusted R^2	0.130	0.116	0.101	0.188
P-value (F test)	0.000	0.000	0.101	0.139

Table 17: Distribution of sample companies across years

This table includes the distribution of US IPO companies and their related M&A offers. Column two includes the frequency of US IPO companies from 1996 to 2014 while column three includes the related M&A offers from 1996 to 2019. Similarly, columns four and five include the frequency of VC-backed IPO companies and their related M&A offers by IPO year.

Year	No. of US IPOs	No. of related M&A offers	No. of VC-backed IPOs	No. of related M&A offers
1996	522	323	197	141
1997	338	208	103	71
1998	203	120	68	39
1999	371	249	238	173
2000	289	194	205	143
2001	55	35	29	19
2002	46	35	19	17
2003	40	21	19	13
2004	126	82	68	47
2005	96	68	34	26
2006	109	72	51	36
2007	113	67	69	46
2008	14	4	7	4
2009	32	19	11	7
2010	65	37	38	19
2011	63	32	37	22
2012	71	35	42	25
2013	106	45	59	27
2014	137	49	80	25
Total	2,796	1,695	1,374	900

Table 18: Descriptive statistics

In Panel A, we include the summary statistics of firm or IPO characteristics for all US IPOs in our sample. In Panel B, we present the mean (median) difference test of firm or deal characteristics by VC presence. In Panel B, column two and three we include the mean (median) values of the variables for VC present and VC absent respectively, while in column four we present the p-value of mean t-test (Kruskal-Wallis test).

Panel A: Summary statistics of all US IPOs

	N	Mean	Median	Std. Dev.	Min	Max
Lead VC present	1347	0.38	0.00	0.49	0.00	1.00
Offer size ($mil)	1374	73.48	56.00	80.95	6.25	1820.00
Underpricing	1374	33.78	18.75	42.23	-7.67	134.17
Total assets ($mil)	1373	149.76	92.77	233.77	1.97	3366.24
MTB	1366	4.68	3.87	2.92	1.32	13.47
Sales ($mil)	1372	64.70	29.85	159.01	0.00	4237.27
Leverage ratio	1366	13.51	0.85	42.50	0.00	294.47
Capital expenditure	1363	0.62	0.65	0.28	-0.02	1.77
Free cash flow	1371	-4.10	-2.59	8.71	-173.22	27.52

Panel B: Summary statistics by VC presence

	VC present	VC absent	Diff (p-value)
M&A offer	0.79	0.57	0.000
	(1.00)	(1.00)	(0.000)
Offer size ($mil)	76.50	71.79	0.339
	(60.00)	(55.00)	(0.348)
Underpricing	32.11	35.10	0.204
	(16.68)	(20.00)	(0.058)
Total assets ($mil)	146.72	150.80	0.749
	(95.08)	(92.27)	(0.533)
MTB	4.47	4.87	0.012
	(3.79)	(3.97)	(0.123)
Sales ($mil)	54.06	71.16	0.026
	(24.85)	(33.00)	(0.003)
Leverage	13.15	13.34	0.939
	(0.92)	(0.77)	(0.789)
Capital expenditure	10.43	8.36	0.198
	(3.13)	(3.13)	(0.812)
Free cash flow	-5.56	-3.29	0.000
	(-3.77)	(-1.75)	(0.000)
Days to completion	83.39	100.42	0.000
	(73.00)	(84.00)	(0.001)
Takeover premium	61.77	46.83	0.002
	(48.66)	(36.31)	(0.001)
CAR (-1, +1 days)	-0.011	-0.007	0.699
	(-0.00)	(-0.00)	(0.877)
Calendar time CAR (+13, +60 months)	-0.99	-0.46	0.112
	(-0.50)	(-0.20)	(0.275)
BHAR (+13, +60 months)	-0.89	-0.53	0.088
	(-0.42)	(-0.26)	(0.012)

Table 19: Correlation table

We include Pearson correlation coefficients for pairwise combinations of our variables. Bold font indicates significance at the 1% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
M&A offer	1.00										
Lead VC present	**0.22**	1.00									
Lead VC present (5 yrs)	**0.24**	**0.89**	1.00								
Offer size	-0.03	0.03	0.02	1.00							
Total assets	-0.03	-0.02	-0.03	**0.26**	1.00						
MTB	0.06	-0.06	-0.06	**0.13**	0.01	1.00					
Sales	0.07	-0.06	-0.06	**0.41**	**0.50**	**0.13**	1.00				
Underpricing	**0.09**	-0.03	-0.02	**0.28**	0.07	**0.23**	**0.08**	1.00			
Leverage	-0.01	0.00	-0.01	0.06	0.07	**0.07**	**0.12**	**-0.11**	1.00		
Capital expenditure	0.01	0.04	0.03	**0.33**	**0.43**	0.01	**0.20**	0.04	**0.31**	1.00	
Free cash flow	0.05	**-0.13**	**-0.10**	**-0.25**	**-0.21**	-0.06	**0.11**	**-0.15**	-0.03	**-0.15**	1.00

Table 20: VC presence and the probability of M&A post-IPO

We estimate a series of logit regressions to predict the effect of VC presence on the probability of a PC receiving M&A offers post-IPO. In Model 1, we include all US IPO companies while in Model 2, we include a propensity score matched sample based on firm size, MTB, and industry (Fama French 48-industry classification). Similarly, in Models 3 and 4, we include all VC-backed IPO companies and PSM sample, respectively. In Model 5, we limit the age of IPO companies to five years post-IPO. VC-backed IPO is a dummy variable that takes a value of one if an IPO is backed by VC. Lead VC present is a dummy variable that equals one if a lead VC is present at the time the PC receives an M&A offer. All other variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted. We report p-value below the coefficients for each variable. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1) US IPOs	(2) PSM VC dummy	(3) VC IPOs	(4) PSM VC presence	(5) VC IPOs (5 yrs)
VC-backed IPO	0.407***	0.574***			
	(0.000)	(0.000)			
Lead VC present			1.180***	1.182***	1.673***
			(0.000)	(0.000)	(0.000)
Institutional own HHI	-1.588***	-1.597***	-1.615***	-1.479**	-0.594*
	(0.000)	(0.000)	(0.000)	(0.014)	(0.098)
Offer size	-0.095	-0.056	-0.353**	-0.560***	-0.034
	(0.309)	(0.587)	(0.033)	(0.009)	(0.779)
Underpricing	0.002*	0.003**	0.002*	-0.000	-0.000
	(0.090)	(0.018)	(0.052)	(0.979)	(0.704)
Total assets	0.060	0.015	0.226*	0.409**	0.026
	(0.338)	(0.864)	(0.074)	(0.017)	(0.739)
MTB	0.000	0.010	0.048*	0.070**	-0.006
	(0.989)	(0.517)	(0.080)	(0.018)	(0.720)
Leverage	0.001	-0.000	-0.002	-0.004	0.003**
	(0.162)	(0.796)	(0.202)	(0.127)	(0.019)
Capital expenditure	0.064	-0.132	0.022	0.060	-0.013
	(0.749)	(0.447)	(0.936)	(0.840)	(0.963)
Free cash flow	-0.005	0.009	0.016**	0.003	0.008
	(0.371)	(0.145)	(0.029)	(0.776)	(0.339)
Industry fixed-effects	2641	2542	1289	938	1255
No. of observations	0.024	0.070	0.061	0.094	0.117
Pseudo R^2	0.000	0.000	0.000	0.000	0.000
P-value (χ_2 test)	0.000	0.000	0.000	0.000	0.000

Table 21: Lead VC presence and anti-takeover policies

We estimate a series of logit regressions to predict whether lead VCs prefer classified boards. In Model 1, 2, and 3, we include all VC IPO companies, all VC IPO companies within the first five years of going public, and all US IPO companies respectively. Lead VC present is a dummy variable that equals one if a lead VC is present at the time the PC receives an M&A offer. VC dummy is a dummy variable that equals one if an IPO company is backed by VC. All other variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted. We report p-value below the coefficients for each variable. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1) US IPOs	(2) VC IPOs	(3) VC IPOs (5 yrs)
VC-backed IPO	0.940***		
	(0.000)		
Lead VC present		0.457***	0.182
		(0.009)	(0.287)
Institutional own HHI	0.191	0.227	-0.075
	(0.571)	(0.699)	(0.892)
Total assets	0.320***	0.121	0.269***
	(0.000)	(0.121)	(0.003)
Leverage	0.109	-0.012	0.110
	(0.812)	(0.931)	(0.153)
MTB	-0.003	0.005	0.008
	(0.636)	(0.217)	(0.239)
R&D	-0.168	-0.106	-0.320
	(0.654)	(0.407)	(0.308)
Industry fixed-effects	Yes	Yes	Yes
No. of observations	895	3730	1855
Pseudo R^2	0.037	0.011	0.020
P-value (χ_2 test)	0.000	0.001	0.000

Table 22: Takeover completion, speed, and premium

We estimate a series of industry fixed-effects regressions to examine the effect of VC presence on the probability of takeover completion, time to complete a takeover and takeover premium. In Models 1, 3 and 5, we include our full sample of VC present and VC absent samples while in Models 2, 4, and 6, we match lead VC present companies with VC absent companies using propensity scores of firm size, MTB, and industry (Fama French 48-industry classification). Lead VC present is a dummy variable that equals one if a lead VC is present at the time the PC receives an M&A offer. All other variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted. We report p-value below the coefficients for each variable. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1) Completion	(2) Completion	(3) Speed	(4) Speed	(5) Premium	(6) Premium
Lead VC present	-0.030	0.151	-12.194***	-7.281**	10.398*	17.055***
	(0.904)	(0.555)	(0.003)	(0.039)	(0.055)	(0.004)
Institutional own HHI	-2.010**	-1.650*	28.831*	22.370	1.209	-3.120
	(0.012)	(0.081)	(0.064)	(0.110)	(0.952)	(0.883)
Total assets	-0.427***	-0.564***	7.745***	4.888	-7.363**	-10.101***
	(0.002)	(0.000)	(0.003)	(0.111)	(0.013)	(0.009)
MTB	-0.017**	-0.022**	-0.264	-0.609***	-0.125	-0.432*
	(0.041)	(0.020)	(0.115)	(0.000)	(0.537)	(0.087)
Leverage	0.002	0.002	0.136	0.152	0.023	0.016
	(0.131)	(0.309)	(0.154)	(0.203)	(0.695)	(0.860)
Capital expenditure	-0.080	-0.058	-13.861**	-18.347***	-1.679	-5.790
	(0.801)	(0.881)	(0.045)	(0.001)	(0.860)	(0.505)
Free cash flow	0.004	0.004	0.043	0.042	-0.384	-0.379
	(0.586)	(0.493)	(0.882)	(0.808)	(0.146)	(0.141)
Intra-industry merger	0.542***	0.674**	-4.102	0.325	1.870	-5.163
	(0.000)	(0.011)	(0.400)	(0.945)	(0.697)	(0.386)
Tender offer	1.711***	2.264***	-46.680***	-46.818***	20.286***	20.475***
	(0.002)	(0.000)	(0.000)	(0.000)	(0.001)	(0.002)
Hostile	-4.369***		172.596***		15.362	-3.168
	(0.000)		(0.000)		(0.134)	(0.765)
All stock payment	1.421***	1.305***	10.281	16.045***	-2.107	-1.025
	(0.000)	(0.000)	(0.123)	(0.008)	(0.780)	(0.892)
All cash payment	1.626***	1.383***	-9.338	-5.540	8.647	6.368
	(0.000)	(0.000)	(0.135)	(0.344)	(0.131)	(0.303)
Number of bidders	-1.784***	-2.243***	34.648*	11.913	12.509	29.254**
	(0.000)	(0.000)	(0.075)	(0.500)	(0.181)	(0.025)
Constant		5.962***	46.128**	74.891***	59.703***	60.117**
		(0.000)	(0.042)	(0.001)	(0.005)	(0.016)
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	769	687	633	576	661	592
Pseudo R^2/Adjusted R^2	0.240	0.292	0.247	0.278	0.094	0.098
P-value (χ_2 test /F-test)	0.000	0.000	0.000	0.000	0.000	0.000

Table 23: Acquirer short- and long-term CAR

We examine the acquirer's short- and long-run market reaction of the takeover. In Model 1, we examine the effect of acquiring a lead VC present IPO company around the merger announcement date. In Model 2 and 3, we examine the long-term market reaction using calendar time and BHAR procedures, respectively. Lead VC present is a dummy variable that equals one if a lead VC is present when the PC receives an M&A offer. All other variables are defined in Appendix 1. Standard errors are White (1980) heteroskedasticity adjusted. We report p-value below the coefficients for each variable. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1) CAR (-1, +1)	(2) CT-60mon	(3) BHAR-60mth
Lead VC present	0.016*	-0.595	-0.032
	(0.094)	(0.121)	(0.908)
Tender offer	0.010	0.487	-0.357
	(0.210)	(0.157)	(0.312)
Intra-industry merger	-0.011	-0.008	-0.078
	(0.243)	(0.983)	(0.748)
Number of bidders	0.009	0.724	0.366
	(0.534)	(0.305)	(0.161)
All stock	-0.021	-1.008*	-0.408
	(0.136)	(0.080)	(0.173)
Relative size	0.003	-0.137	0.017
	(0.860)	(0.563)	(0.904)
ROA (target)	-0.000	0.010*	-0.002
	(0.281)	(0.096)	(0.516)
Sales (target)	0.000	-0.093	0.135**
	(0.904)	(0.423)	(0.033)
ROA (acquirer)	-0.061	-1.830	-1.604
	(0.162)	(0.354)	(0.109)
Sales (acquirer)	0.005*	0.157	0.167*
	(0.053)	(0.168)	(0.050)
Constant	-0.055**	-1.614	-2.514**
	(0.048)	(0.205)	(0.020)
Industry fixed-effects	Yes	Yes	Yes
No. of observations	438	425	424
Adjusted R^2	0.037	0.003	0.051
P-value (F test)	0.018	0.012	0.058

Appendices

A. Variable definitions for Chapter 2

Variable	Description
Dependent Variables	
Exit time (in years)	The time, in years, that lead VCs take to divest all their holdings after an IPO. We measure this variable as the difference between the IPO date and the date when the lead VC's ownership becomes zero.
Lead VC ownership	The fraction of outstanding shares held by the lead VCs after an IPO. We hand-collect this data from various SEC filings (10-K, 424B3, 424B4, 424B5, DEFM 14/A, DEFR 14, Form 4, S-1, S-3, SB-2, SB-23, SC 13G/D/A).
Exit mechanisms	Exit mechanisms are the pathways that lead VCs take to divest their holdings after an IPO. To collect this information, we web scrape all insider trading data from the SEC website using first the lead VC firm name, followed by the lead VC fund and their managers, whenever available. We check the comment section labeled "Explanation of Responses" or "Remarks" in each Form 4 filing and carefully identify whether the lead VC sells shares in the open market (C Sales), distributes shares to LPs (SDs) or sells the entire company to an acquiring company (M&A). We supplement this data with SC 13G/D and any other SEC filings that include the lead VC firm or fund name by reading through the filings manually.
Majority Exit Mechanisms	
Majority continuous sales (C Sales) in open market	Dummy variable that equals one when the lead VC divests more than 50% of their IPO holdings by selling shares in the open market after the IPO.
Majority M&A	Dummy variable that equals one when the lead VC divests more than 50% of their IPO holdings during a merger with another company after the IPO.
Majority share distributions (SDs)	Dummy variable that equals one when the lead VC divests more than 50% of their IPO holdings by distributing shares to their limited partners after the IPO.
Variables Used to Predict Exit Time/Exit Mechanisms	
Blockholder ownership at the IPO other than VC	Percentage ownership of blockholders other than the VC at the IPO. We exclude ownership of all VCs (not just the lead VC) invested in a PC. Source: S-1, 424B3/424B4 filings available on the SEC website.
High tech dummy	Dummy variable for high technology PCs. Source: SDC
Investment period before the IPO	Difference between the lead VC's first investment date and the IPO date. This variable represents the portion of the lead VC's total investment life cycle before the IPO.
Investment preference later stage	Dummy variable that equals one if the lead VC prefers to invest at a later stage in a portfolio company. Source: SDC
IPO multiplier	This variable measures the relation between the total amount that the lead VC invests and the VC's share value at the IPO. We measure this as (No. of lead VC shares at the IPO * IPO price) / total amount invested by lead VC in all rounds. Source: SDC, SEC filings
IPO price	Price at which the shares are issued at the IPO. Source: SDC
IPO size	Size of IPO calculated as the log of IPO proceeds. Source: SDC
Lead VC age before the IPO	Age of the lead VC firm before the IPO, calculated by subtracting the firm founding date or Jan. 1, 1980, whichever is later, from the IPO date. We use Jan. 1, 1980, as this date is typically considered to be the start of the modern VC era per the ERISA relaxation of the "prudent man rule," which allowed pension funds to invest in VCs (Gompers and Lerner, 1999; Hellmann, Lindsey, and Puri, 2008). See also Krishnan et al. (2011).
Lead VC in audit committee at the IPO	Dummy variable that equals one if a lead VC holds a position in the audit committee at the IPO.
Lead VC in compensation committee at the IPO	Dummy variable that equals one if a lead VC holds a position in the compensation committee at the IPO.
Lead VC in governance committee at the IPO	Dummy variable that equals one if a lead VC holds a position in the governance committee at the IPO.
Lead VC ownership at the IPO	Percentage of lead VC shares outstanding at the IPO. Source: S-1, 424B3/424B4 filings.

Lead VC total known investment	This variable measures the total investment that a lead VC makes in all financing rounds before the IPO. It is calculated as the log of the SDC variable 'Firm Total Known Investment'. Source: SDC
No. of previous IPOs by the lead VC	Number of previous IPO exits by the lead VC before a particular IPO. We do not count any IPOs before January 1, 1980. Source: SDC.
No. of previous M&As by the lead VC	Number of exits via a merger by a particular lead VC. We search for each lead VC in FactSet, download all investments (active and exited), use Python code to search for trade sales (both public and private), and count all previous M&As. Source: FactSet
No. of rounds received by the company	Number of rounds of funding that the PC receives. Source: SDC
No. of VCs invested in the company	This variable counts the number of all VCs (not just the lead VCs) invested in a PC. Source: SDC
PC age before the IPO	Age of the portfolio company before the IPO, calculated by subtracting the PC founding date from the IPO date. We retrieve the PC founding date and the IPO date mostly from the SDC. If they are missing in SDC, we search FactSet, the Thompson Reuters website, and Bloomberg.
% change in stock price from IPO to IPO+182 days	Percentage change in the stock price from the IPO date to the lockup date expiry. We retrieve stock price data from CRSP and calculate this variable as ((price 182 days after the IPO – first day closing price) / first day closing price) * 100
% change in stock price from IPO+182 to IPO+365 days	Change in the PC firm's stock price from the lockup period to a year after the IPO. We collect stock prices from CRSP and calculate this variable as ((price 365 days after IPO – price 182 days after IPO) / price 182 days after IPO) * 100
Underpricing	Underpricing measured as ((Stock price at the closing of first day of trading – IPO price) / IPO price) * 100. Source: CRSP, SDC
Variables Used to Predict Lead VC Ownership	
Average return (AR)	Geometric mean of monthly returns between any two consecutive ownership dates. Source: CRSP
Average S&P500 return	Geometric mean of monthly S&P500 returns between any two consecutive ownership dates.
Capital expenditures	Average of all ratios of quarterly capital expenditures to quarterly total assets between any two consecutive ownership dates. Source: Compustat
Cash	Average of all ratios of quarterly cash holdings to quarterly total assets between any two consecutive dates. Source: Compustat
Excess S&P500 return	Return of the PC relative to the S&P 500, calculated as the geometric mean of (PC return – S&P 500 return) between any two consecutive ownership dates. Source: CRSP
Firm size	Average log of the quarterly total assets between any two consecutive lead VC ownership dates. For example, if we have consecutive ownership data for March 1, 2010 and March 15, 2011, we measure the firm size in 2011 as the average of the 1st, 2nd, 3rd, and 4th quarter of 2010. Source: Compustat
Intangible assets	Average of all ratios of quarterly intangible assets to quarterly total assets between any two consecutive ownership dates. Source: Compustat
Lagged VC ownership	One-period lagged lead VC ownership in decimals.
Leverage	Debt level of the PC firm, calculated as the average of quarterly total debt divided by quarterly common equity (the CEQQ variable in Compustat Quarterly) between any two consecutive ownership dates. Source: Compustat
MTB	Market to book value ratio, calculated as the average of all ratios of market value (PRCCQ * CSHOQ) to CEQQ between any two consecutive ownership dates. PRCCQ is the closing stock price at the end of a quarter, CSHOQ is the common stock outstanding at the end of a quarter, and CEQQ is the common/ordinary equity at the end of a quarter. Source: Compustat
Net sales/turnover	Average of all ratios of quarterly sales to quarterly total assets between any two consecutive ownership dates. Source: Compustat
ROA (return on assets)	Average of all ratios of OIBDPQ to quarterly total assets between any two consecutive ownership dates. OIBDPQ is quarterly operating income before depreciation. Source: Compustat

ROE (return on equity)	Average of OIBDPQ to quarterly equity between any two consecutive ownership dates. OIBDPQ is quarterly operating income before depreciation. Source: Compustat

B: Variable definitions for Chapter 3

Variable	Definitions	Data Source
Lead VC present	Dummy variable that equals one if an IPO company's lead VC is present at the time of the M&A offer, and zero otherwise. This identifies all companies where lead VC has not exited from the company.	Hand collected; SEC filings
No. of institutional blockholders	Total number of institutional blockholders (stockholders holding more than five percent of total outstanding shares) one quarter prior to the merger announcement date.	Thomson Reuters Institutional (13f) Holdings
Banks	Dummy variable that equals one if a bank is an institutional blockholder one quarter prior to the offer date, and zero otherwise. We identify banks using Thomson Reuters classification criteria "type code" following Field and Lowry (2009) and Barabanov et al. (2008).	Thomson Reuters Stock Holdings
Insurance companies	Dummy variable that equals one if an insurance company is an institutional blockholder one quarter prior to the offer date, and zero otherwise. We identify insurance companies using Thomson Reuters classification criteria "type code."	Thomson Reuters
Investment advisors	Dummy variable that equals one if an investment advisor is an institutional blockholder one quarter prior to the offer date, and zero otherwise. We identify investment advisors using Thomson Reuters classification criteria "type code."	Thomson Reuters
Value of the transaction	Total consideration paid by the acquirer to the target in USD billions, excluding any fees and expenses.	SDC
Multiple bidders dummy	Dummy variable that equals one if there are multiple bidders in an M&A offer, and zero otherwise.	SDC
Tender offer dummy	Dummy variable identifying tender offers.	SDC
Termination agreement dummy	Dummy variable indicating the presence of a termination agreement between the acquirer and the target.	SDC
Intra-industry merger dummy	Dummy variable that equals one if the acquirer and the target are from the same industry based on two digit SIC codes, and zero otherwise.	SDC
Takeover premium	Initial takeover premium offer by the acquirer calculated as (initial offer price/target stock price four weeks prior to M&A announcement)-1.	SDC
Lead VC age	Lead VC age in years at the offer date calculated as the difference between the merger announcement date and the lead VC founding date or January 1, 1980, whichever is later.	SDC
No. of previous IPOs by lead VC	Total number of previous IPOs backed by the lead VC until one quarter before the merger announcement date.	SDC
No. of previous M&As by lead VC	Total number of M&A exits by the lead VC until one quarter before the merger announcement date.	FactSet
First M&A by lead VC dummy	Dummy variable that equals one if the lead VC is exiting via an M&A for the first time, and zero otherwise.	FactSet
Investment period before the IPO	Difference between the lead VC's first investment date in the company and the IPO date.	SDC
Total assets	Log of total assets one quarter prior to the offer date.	Compustat
Long-term debt	Ratio of total long-term debt to total assets measured one quarter prior to the offer date.	Compustat
Market-to-book ratio	Ratio of the market value of common equity of a company divided by its book value of equity measured one quarter prior to the offer date. We calculate the market value of equity by multiplying the price of the common stock by the total number of shares outstanding.	CRSP, Compustat

R&D expenses	Ratio of research and development expenses to total assets measured one quarter prior to the offer date.	Compustat
Sales growth	Ratio of ($Sales_{t-1}$-$Sales_{t-2}$)/$Sales_{t-2}$ based on data one quarter prior to the offer date.	Compustat
PE ratio	Ratio of a company's stock price to its earnings per share, based on data measured one quarter prior to the offer date.	Compustat
Financial trouble dummy	Dummy variable that equals one if Altman's Z score is below 1.8, and zero otherwise. Altman's Z-Score is equal to 1.2A + 1.4B + 3.3C +0.6D + 1.0E, where A = Working capital/Total assets; B = Retained earnings/Total assets; C = Earnings before interest and tax/Total assets; D = Market value of equity/Total liabilities; E = Sales/Total assets. If Altman's Z-Score is below 1.8, it suggests that the company has financial problems and may go bankrupt. The underlying data is collected one quarter prior to the offer date.	Compustat
Price runup	Price change between day -42 to -1 prior to the takeover announcement date (day 0), calculated as (stock $price_{-1}$ – stock $price_{-42}$)/stock $price_{-42}$.	CRSP
No. of bidders	The number of bidders in a merger.	SDC
All stock dummy	Dummy variable that equals one if the offer payment consideration includes only stock, and zero otherwise.	SDC
All cash dummy	Dummy variable that equals one if the offer payment consideration includes only cash, and zero otherwise.	SDC
Market value of equity	Natural logarithm of market price of the total common stock of a company measured by multiplying the price of the common stock by the total number of shares outstanding.	Compustat
Hostile offer dummy	Dummy variable that equals one if the offer is labelled as "hostile" or "unsolicited" by the SDC, and zero otherwise.	SDC

C. Variable definitions for Chapter 4

Variable	Definitions
Dependent Variables	
M&A offer	Dummy variable that equals one if a portfolio company receives an M&A offer after the IPO, and zero otherwise. Source: SDC
Days to completion	Number of days in between the announcement date and the completion of the merger. Source: SDC
Takeover premium	Premium calculated as (offer price/target stock price 4 weeks prior to M&A announcement)-1. Source: SDC
Independent Variables	
Lead VC present	Dummy variable that equals one if an IPO company's lead VC is present at the time of the M&A offer, and zero otherwise. This identifies all companies where lead VC has not exited from the company. Source: Hand collection, SEC filings
Lead VC present (5 yrs)	Dummy variable that equals one if a lead VC is present during the entire first five years of a PC's post-IPO life or is present until the PC is delisted during its first five years of going public. Source: Hand collection, SEC filings
VC-backed IPO	Dummy variable that equals one if an IPO company is backed by a VC, and zero otherwise. Source: SDC
Control Variables	
Institutional own HHI	Institutional ownership concentration measured as Herfindahl-Hirschman Index at the end of the previous year. Source: Thomson Reuters Institutional (13f) Holdings
Offer size	Natural logarithm of IPO proceeds. Source: SDC
Total assets	Natural logarithm of a PC's total assets at the IPO. Source: SDC
MTB	Market-to-book ratio calculated as the ratio of a PC's market value of common equity to its book value of equity. We calculate the market value of equity by multiplying the price of the common stock by the total number of shares outstanding. Source: SDC, CRSP
Sales	Natural logarithm of a PC's sales revenue at the IPO. Source: Compustat

Underpricing	Underpricing measured as (Stock price at the closing of first day of trading – IPO price) / IPO price * 100. Source: SDC, CRSP
Leverage	Ratio of long-term debt to total assets. Source: SDC, Compustat
Capital expenditure	Ratio of capital expenditure to sales revenue. Source: Compustat
Free cash flow	Ratio of income before extraordinary items to total assets. Source: Compustat
R&D	Ratio of research and development expenses to total assets. Source: Compustat
Intra-industry merger	Dummy variable that equals one if the bidder and the target belong to the same industry i.e., have the same two digit SIC codes, and zero otherwise. Source: SDC
Tender offer	Dummy variable that equals one if there is a tender offer, and zero otherwise. Source: SDC
Hostile	Dummy variable that equals one if the attitude of the bidder is hostile during the merger, and zero otherwise. Source: SDC
All stock payment	Dummy variable that equals one if the acquirer makes all stock payment for the acquisition, and zero otherwise. Source: SDC
All cash payment	Dummy variable that equals one if the acquirer makes all cash payment for the acquisition, and zero otherwise. Source: SDC
Number of bidders	Number of bidders in an M&A offer. Source: SDC
Relative size	Ratio to target's total assets to acquirer's total assets. Source: SDC, Compustat
ROA	Ratio to net income to total assets. Source: SDC, Compustat