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Impact of Venture Capital Holding on Firm Life Cycle: Evidence from IPO Firms*

Shima Amini

Leeds University Business School

Abdul Mohamed

Leeds University Business School

Armin Schwienbacher

SKEMA Business School — Université Côte d'Azur

Nicholas Wilson

Leeds University Business School

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Contact address of authors: Shima Amini: Accounting and Finance Division, Leeds University Business School, Moorland Road, Leeds LS2 9JT (United Kingdom), email: S.Amini@lubs.leeds.ac.uk; Abdul Mohamed: Accounting and Finance Division, Leeds University Business School, Moorland Road, Leeds LS2 9JT (United Kingdom), email: A.Mohamed@leeds.ac.uk; Armin Schwienbacher: SKEMA Business School, Avenue Willy Brandt, F-59777 Euralille (France), email: armin.schwienbacher@skema.edu; Nicholas Wilson: Accounting and Finance Division, Leeds University Business School, Moorland Road, Leeds LS2 9JT (United Kingdom), email: N.Wilson@lubs.leeds.ac.uk.

Impact of Venture Capital Holding on Firm Life Cycle: Evidence from IPO Firms

Abstract

This paper examines the impact of VC ownership beyond the IPO listing on important and consequential corporate decisions in a firm's lifetime. We find that VC funds delay the initiation of dividends by approximately two years, delay the use of external growth strategies, and postpone introduction to the corporate bond market. These results are consistent with the view that VC funds extend the growth phase of the firm. We show that their presence at the time of these decisions leads to positive stock price reactions, suggesting that they provide a certification effect that signals continued growth opportunities, and that VC certification is not limited to the IPO listing.

Keywords: venture capital; corporate ownership; IPO; corporate governance

JEL classifications: D25; G32

1. Introduction

Venture capital (VC) funds invest in high-growth startups and generate returns on their investments through a positive exit in the form of either a trade sale or an initial public offering (IPO) (Cumming, 2008; Megginson and Weiss, 1991). They also provide guidance to portfolio companies that have high growth potential and assist them in exploiting market opportunities (Tian 2012). Often however, they remain as shareholders and even members of the board of directors in these newly listed firms for many years (Krishnan et al., 2011; Paeglis and Veeren, 2013). Little is known about the VC's impact on important corporate decisions after the firm has gone public. Some firms continue to raise VC despite having gone public (Iliev and Lowry, 2020). In this paper, we study how the continued presence of VC shareholders, after the IPO, impacts important corporate decisions that characterize a firm's corporate life cycle, namely dividend initiation (DI), the first bond and seasoned equity issuance, and the first decision to acquire another company after the public listing.

While going public is certainly in itself a significant event in a firm's lifetime (Celikyurt, Sevilir, and Shivdasani, 2010), other events are also important milestones once the company is listed on a stock market. One is the decision to start paying dividends (Asquith and Mullins, 1983). DI announcements increase the trading volume of the firm's stock (Richardson, Sefcik, and Thompson, 1986) and lead to important changes in stock prices (Kale, Kini, and Payne, 2012), which provide important information about the firm's future prospects. This attracts new investor types (Kale, Kini, and Payne, 2012). The DI decision is especially crucial for high-growth firms, since these firms typically require significant investments and thus prefer reinvesting excess cash

over paying dividends to shareholders. For these firms, DI could signal a possible shift from being a firm with significant growth opportunities to one that has entered a more mature stage of development (consistent with the financial life-cycle explanation of dividend policy; DeAngelo, DeAngelo, and Stulz, 2006; Owen and Yawson, 2010; see also Miller and Friesen, 1984, for a conceptual discussion of the corporate life cycle of firms).[1] In this case, DI means the firm lacks further investment opportunities and thus its future growth should go down to a more moderate level; empirically, this translates into negative abnormal returns at the time of announcement if it comes as a surprise, and at best no stock market reaction if anticipated by the market. We postulate that the presence of VC funds as shareholders in the firm mitigates the possibly negative announcement effect, as their presence indicates persistence in investment opportunities. Another reason for expecting a positive stock market reaction in response to DI in the presence of VC funds is that they impose restrictions on managers and increase external monitoring of corporate agency problems (DeAngelo, DeAngelo, and Stulz, 2006). While DI also restricts the possibility for managers to use corporate earnings to pursue their private interests and prevents them from investing free cash flow in suboptimal projects, the monitoring ensured by VC funds offers an additional mechanism for controlling management. Celikyurt, Sevilir, and Shivdasani (2014) show that this monitoring argument even applies to mature firms that have gone public many years before and in which VC funds continue to be present on the board of directors as active investors.

[1] In line with prior literature on payout policy, we focus exclusively on DI. For instance, Brav, Graham, Harvey, and Michaely (2005) offer empirical evidence that DI is more important for a firm than share repurchase (the alternative way of paying out cash to shareholders), since DI represents a crucial milestone in the development of a firm due to its "inflexibility" to regularly change policy. Share repurchases are considered instead as a short-term measure.

We further postulate that the VC funds' presence is associated with a DI delay. Indeed, the presence of VC funds as shareholders may reflect the fact that these firms have not yet matured enough and continue to invest in innovation and growth. For instance, Liu and Tian (2021) document that VC investors tend to gather information from the public market when making investment decisions regarding their start-ups. Hence, they are likely to do so for the IPO companies they back when considering dividend initiation to avoid a negative market reaction. Similarly, the reliance on corporate bonds indicates that the company is ready to commit to significant interest payments in the future and thus has shifted to the next phase of its life cycle. In contrast, we expect firms with still significant VC backing to rely more on equity and thus accelerate their first seasoned equity issuance while postponing the issuance of corporate bonds. Finally, we explore the timing of a first acquisition after the IPO, as a sign of shifting the firm from an internal to an external growth strategy. In the presence of VC funds, we expect longer reliance on an internal growth strategy and thus postponement of the first acquisition after the listing. Taken together, these effects on different corporate decisions are the result of an extended life cycle of VC-backed firms.

In order to investigate these issues, we hand-collected relevant information on a large sample of 1,409 IPOs in the United States from 2000 to 2017. For each IPO, we collected information until the end of 2018 on whether the firm received VC, when the VC funds exited the firm, the presence of other institutional investors, and various post-IPO stock price and accounting data. We also checked that at least one VC fund was sitting on the board of directors under VC ownership, which was the case in all our VC-backed firms. We collected ownership information

for each year after IPO until the end of 2018. We retrieved the date of DI, first corporate bond and seasoned equity issuance, and the date of their first important corporate acquisition. Out of the 1,409 IPOs in the sample, 43% of VC-backed IPO firms, against 73% of non-VC-backed IPO firms, initiated dividends within the first 10 years after the IPO, while the rest paid dividends much later or never. The difference between VC-backed and non-VC-backed IPO firms is consistent with our prediction about DI. About 22% of the firms had a first major M&A and 39% their first bond issuance, with little differences between the two subsamples. For first seasoned equity, we obtained a rate of 50% for VC-backed and 71% for non-VC-backed firms sampled.

For our main analyses, we used survival models, which have often been used in corporate finance to study related issues (e.g., Kale, Kini, and Payne, 2012, for dividend initiation). We then identified the relationship between VC ownership (in percentage of shares owned and number of VC firms as shareholders) and the time until a specific corporate decision was made, such as dividend initiation. We found that VC presence in IPO firms delayed DI, which was consistent with the financial life-cycle explanation of dividend policy (DeAngelo, DeAngelo, and Stulz, 2006). While prior research has shown that the initiation of dividend payment is driven by the earned/contributed capital mix (the proxy for a firm's life-cycle stage), we showed that VC presence matters as an important factor in this shift of strategy. Moreover, we found that DI no longer constitutes a negative signal (as measured by an abnormal stock market reaction) as long as a VC fund is participating as shareholder and sitting on the board of directors. In this case, the effect is significantly positive, suggesting that the company is still in its growth phase, and VC presence offers an important sign of continued commitment to growth and innovation.

As to the other important corporate decisions in a company's lifetime, we showed that the presence of VC firms delayed the use of external growth strategies (through acquisitions) and postponed the introduction to the corporate bond market. However, we found no significant difference in the timing of seasoned equity offerings as a source of follow-up funding. These results can all be interpreted using the lens of the firm's financial life-cycle explanation, except for seasoned equity where we also expected a significant difference.

Several robustness checks were performed on these results, including controlling for possible reverse causality using the entropy balancing method (Chapman, Miller, and White, 2019) and more traditional instrumental variable approaches to control for self-selection of VC-backed firms. Both methods allow a better comparison between VC-backed and non-VC-backed firms. Moreover, we found that VC characteristics were not different between the IPO year and a year prior to the corporate event, which led us to the conclusion that VC characteristics do not affect our results. All our regression specifications throughout the entire analysis included various control variables that allowed us to take into account major differences between VC-backed and non-VC-backed IPO firms. These controls are important since VC-backed IPO firms may be different, notably because they tend to be younger at the time of public listing. Controlling for various differences in firm characteristics therefore helps to rule out the possible alternative hypothesis that the documented differences in timing in VC-backed firms are due to the simple fact that they are younger or still investing more in R&D at the time of their IPO. As an additional test, we showed that the main results regarding the higher participation of VC funds in

corporate decisions similarly only hold within the subsample of VC-backed IPO firms. This suggests that our results cannot be explained by this alternative hypothesis.

We offer the following contributions to the academic literature. First, we contribute to the literature on the firm's financial life-cycle explanation by extending it to important corporate decisions other than dividend payout (DeAngelo, DeAngelo, and Stulz, 2006) and acquisition (Owen and Yawson, 2010). Crucially, we extend the discussion by showing the impact of VC presence on all of these corporate decisions, including DI and first M&A. Second, we add to the academic debate on dividend policy (Short, Zhang, and Keasey 2002; Allen and Michaely, 2004; Grinstein and Michaely 2005; Kale, Kini, and Payne, 2012; Grennan, 2019), the underlying signaling effects (Venkatesh, 1989; John and Williams, 1985; and Allen, Bernardo, and Welch, 2000), and the timing of DI (Bulan, Subramanian, and Tanlu, 2007; Kale, Kini, and Payne, 2012). Grennan (2019) examines the dividend decision for mature companies and finds that the decision to initiate dividend is a direct response to peer influence within the same industry. Prior research has also shown that the presence of institutional investors affects the timing of DI (Kale, Kini, and Payne, 2012), without however relating it to the presence of VC funds.[2] Kale, Kini, and Payne (2012) find that the presence of institutional investors leads to earlier DI, and argue that these investors can more easily identify the IPO firms going public who are able to pay out dividends more quickly (Allen, Bernardo, and Welch, 2000). It is important to extend this analysis given the role played by VC funds in high-growth firms, especially given that the

[2] Kale, Kini, and Payne (2012) use the CDA/Spectrum database (now called Thomson-Reuters Mutual Fund Holdings database) to assess institutional holdings. It does not include VC participation. VC funds are generally not considered as institutional investors in databases. This is also true for our database, so we hand-collected this information.

mechanism likely to explain VC presence is not the same as for institutional investors. Typically, institutional investors buy and hold stakes in IPO firms as part of their long-term investment strategy, while VC funds are driven to hold shares beyond IPO by their incentive to time their exit. Hence, these opposing strategies have different information effects. Third, we contribute to the understanding of how VC funds help companies grow. It is well documented in the literature that VC-backed IPO firms outperform non-VC-backed ones (Brav and Gompers, 1997), but the underlying mechanism requires further study. VCs are also known to enhance the value of their IPOs and provide certification for their qualities at the time of the IPO (Megginson and Weiss, 1991). We document that the capacity of VC funds to deal with the problem of information asymmetry extends beyond the initial stage and the IPO certification, to the post-IPO life of the firm. We do so by showing that VC presence at the time of a key corporate decision such as DI leads to a positive abnormal stock market return, which offers evidence of a certification effect. Fourth, we contribute to the literature on VC exits, which mostly focuses on the choice of different exit routes (Cumming, 2008) – assuming VC funds exit immediately after the IPO is conducted – and whether VC-backed IPOs are any different from non-VC-backed IPOs. However, we are not aware of any study that explores the impact of VC presence on important corporate decisions post-IPO and on DI in particular. One that is closest to this study is the work by Iliev and Lowry (2020) that studied the VC financing of publicly listed firms, evidencing that some newly listed firms continue to raise VC after the IPO. Their findings are consistent with the view that VC funds continue to finance these firms due to remaining information asymmetry problems that generally plague VC-backed firms after becoming private. Paeglis and Veeren (2013) document the fact that VC funds often stay well beyond the IPO, and that the decision to

exit has negative consequences for stock prices. However, both of these studies are silent about how VC funds affect the important corporate decisions studied here.

The rest of the paper is organized as follows. Section 2 describes the dataset, sample selection, and methodology. Section 3 describes the sample and presents the results and different robustness checks. Section 6 concludes.

2. Data and Methodology

2.1 Data sources

Our initial sample consisted of all IPOs listed between January 2000 and December 2017 collected from the Thomson Financials Securities Data Companies (SDC) Platinum New Issues database and cross-checked with Ritter's database. Consistent with the IPO literature, we excluded closed-end funds, rights offerings, and unit offerings (Hasan, Kobeissi, and Wang, 2011). Following Loughran and McDonald (2013), we also excluded IPO companies with an offering price below $5.00. Firm-level IPO characteristics were collected from the Compustat database, information on whether the IPO was VC-backed or not was collected from SDC Platinum. VC holdings at the time of IPO and post-IPO were collected manually from the Thomson Reuters Eikon database. This involved searching for the IPO firm manually on the Thomson Reuters Eikon database and cross-checking the name and CUSIP with SDC Platinum. Next, we used the ownership section of the database to select the shareholder history report for the IPO firm. The report provided detailed information about the investor's name, type, and the number of shares they held on a quarterly basis each year. We collected each VC firm's holding

in the last quarter of each year and then aggregated the holdings of all VC firms in a specific IPO firm each year up to the end of 2018. For institutional investors, we collected the aggregate holding from Thomson Reuters Institutional (13f) Holdings. Underwriters' reputation data was drawn from Loughran and Ritter (2004) (collected from Jay Ritter's website), while data on the dividend premium was collected from Baker and Wurgler (2004). The data on dividend premium is available on a monthly basis on Wurgler's website. To be included in the final IPO sample, both accounting data and market data had to be available for the listed firms. We used Compustat to collect accounting information and CRSP for market data. If the accounting value was missing for both the IPO year and pre-IPO year, we attempted to search manually using various sources including the IPO prospectus. After these restrictions, we had a final sample of 1,409 IPOs. To eliminate the impact of outliers, we winsorized all firm-level variables at the 1% level.

We tracked each IPO firm of our sample in Compustat until December 2018 to determine whether and when it initiated a dividend payment. We defined the time to dividend initiation as the time elapsed between the IPO date and the date in which an IPO firm announced its first dividend payment. IPO firms that had not initiated dividend payments by the end of December 2018 were classified as right-censored observations and therefore retained in the analysis to avoid creating a bias for the latest firms. In our sample of 1,409 IPOs, 861 of them were classified as right-censored, while the remaining 548 IPO firms initiated dividend payments during our sample period. Similar to the time to dividend initiation, we tracked the IPO firms from the IPO date to the date of the first acquisition, first corporate bond issuance, and first seasoned equity offering. We measured the time to first M&A (first corporate bond issuance,

first seasoned equity offering) after IPO as the time elapsed between the IPO date and the date of first M&A announcement (first corporate bond issuance, first seasoned equity offering) from the SDC database. In our sample of 1,409 IPO firms, 223 had an M&A during our sample period (375 IPO firms started issuing corporate bonds and 567 had seasoned equity offerings). All our variables are defined in Appendix Table 1.

2.2 Methodology of estimation

We estimated the time to dividend initiation using a survival model known as the Accelerated Failure Time (AFT) model. The model had been used in several previous studies (e.g., Kale, Kini, and Payne, 2012). The AFT model allows the impact of the independent variables on time to dividend initiation to vary over the post-IPO period depending on the length of time since listing. We used the same method to model the time to first acquisition, the time to first corporate bond issuance, and the time to first seasoned equity offering. Some studies use the AFT model with cross-sectional data, where all IPO characteristics are measured at the time of listing. This approach does not provide a full understanding of the dynamics of VC influence on major corporate decisions. To fully capture the impact of VCs on such significant decisions, we used a panel data setting, where both VCs and IPO characteristics were collected up to the event of interest (i.e., dividend initiation, first M&A, first bond issuance, or first seasoned equity offering) and observations were added for each year until the event occurred.

The AFT model is expressed in terms of a log-linear function with respect to time:

$$\mathrm{Ln}(\mathrm{T_{jt}}) = \boldsymbol{\beta}_0 + \boldsymbol{\beta}_1 X_{1t} + \ldots \boldsymbol{\beta}_\mathrm{p} X_{pt} + \boldsymbol{\varepsilon}_\mathrm{jt}$$

In the AFT model, $\exp(\beta_i X_{it})$ is an "acceleration factor". The effect of a covariate is to extend or shrink the length of time to dividend initiation by a constant relative amount $\exp(\beta_i X_{it})$. If $\exp(\beta_i X_{it}) > 1$, time to the event is increased (thus, a postponement), and if $\exp(\beta_i X_i) < 1$, it is decreased (Bradburn et al., 2003). When using the AFT model, the distribution of the baseline survival function must be specified. Hence, we used AIC criteria to choose the appropriate distribution for our data. Based on the test, we chose the Log-normal distribution for the analysis of our data.

As a robustness check and for comparison purposes with other studies, we also estimated the Cox Proportional Hazard model applied by Kale, Kini, and Payne (2012). The Cox model makes no assumption about the failure distribution. The dependent variable in the Cox model measures the "risk" of initiating dividend (hazard rate) as opposed to the time to dividend initiation in the AFT model. In the Cox model, the marginal effect of an independent variable is measured by the so-called hazard ratio. A positive coefficient implies a hazard ratio (calculated as the exponentiated coefficient from the Cox model; see e.g., Kleinbaum, 1996) greater than one, suggesting that an increase of the covariate increases the hazard rate (risk of initiating dividend) and decreases the time to dividend initiation. Similarly, a negative coefficient implies a hazard ratio of less than one and increases the time to dividend initiation when the covariates increase by a unit.

The corresponding measure of the marginal effect in the AFT model is the so-called time ratio. The time ratio is calculated as the exponential of the AFT coefficient (see, e.g., Bradburn et al., 2003, p. 434). A positive AFT coefficient implies a time ratio greater than one, which indicates

that an increase in the covariate increases the time to dividend initiation. As a consequence, we expected that a given independent variable with a positive sign and a time ratio above one in the AFT model would have a negative coefficient and a hazard ratio less than one in the Cox model due to the structural differences between the Cox and AFT models.

2.3 Control variables

We controlled for alternative factors that have been shown to be significant determinants of dividend pay-out and of the other corporate decisions we investigated. Large companies with perceived high future growth opportunities are unlikely to adopt a policy of paying out dividend. This is because dividend policy is considered a long-term commitment by the companies. Hence, the agency theory (Jensen, 1986) predicts longer time to dividend initiation for large companies with high potential future growth. We measured the size of the company as a natural logarithm of total assets, and growth opportunity as the ratio between a closing price and the book value per share at the end of the fiscal year (consistent with Denis and Osobov, 2008). Similarly, companies with high leverage are unlikely to commit to dividend initiation as this might induce a high agency cost of debt and endanger the servicing of debt liabilities in the future. We included leverage, measured as the ratio of total debts to total asset.

Kale, Kini, and Payne (2012) document that for mature companies, reputation of the underwriters, R&D expenditure, trading volume, and whether or not the company is trading on the New York Stock Exchange influence dividend initiation policies and are generally motivated by their impact on information asymmetry (consistent with Miller and Rock's (1985) argument

that initiating dividend payouts signals a firm's high quality). We therefore controlled for age of the company, underwriter reputation, R&D expenditure, trading volume and whether or not the IPO was listed on the New York Stock Exchange. Baker and Wurgler (2004) find that companies are likely to initiate dividends when the market premium for dividend paying stocks is high. If dividend initiation is mainly influenced by market timing and not due to other considerations, we expected the dividend premium to have a positive impact on the likelihood of dividend initiation. Thus, we controlled for dividend premium, measured as the difference between the logarithms of the market-to-book ratios of dividend payers and non-payers, similar to Baker and Wurgler (2004). Finally, Fama and French (2001) report that dividend payers tend to be more profitable since they are more able to pay out cash, so we included profitability as measured by operating income before depreciation divided by total assets. Appendix Table 1 provides detailed definitions of the variables.

3. Results

The following section discusses the univariate and multivariate analyses. We started with the univariate analysis followed by the multivariate analysis.

3.1 Univariate analysis

We started with the proportion of VC holdings in VC-backed IPO firms (i.e., we excluded non-VC-backed firms and dropped firms in follow-up years when VCs had left) up to 10 years after the listing. Table 1 shows the mean and median values of VC holdings and VC numbers from the IPO year (i.e., Year 0) to year 10 post IPO. The mean VC holding at the time of listing is 29.7%

and the median is 27%. VCs sell about a third of their holdings within the first year of listing (which corresponds to a reduction from 29.7% to 19.3% of total shares) and further 5% of total shares are sold by VC funds during the second year.[3] However, from year 3 onwards, they sell approximately 1% of total shares on average every year. After three years, VC funds continue to hold, on average, 10.6% of ownership in their firms. The fact that VCs sell substantially less of their holding 3 years post listing is consistent with the study by Krishnan et al. (2011), who finds similar patterns in the context of lead VCs. The interesting observation is the fact that VCs do not fully liquidate their holdings in IPO firms quickly after the public listing, but rather stay involved for many years. On average, the number of VCs involved in the IPO firms at the time of listing was 2.97 with a median of 3 VCs. The table shows a small marginal change in the mean and median values of the number of VCs between year 1 and year 4. More generally, the average number of VCs that stayed involved decreased slowly. This is further highlighted by the number of observations used for the calculation, which was significant for the first three years only (from 777 in year 0 to 332 in year 4). For instance, it shows that VCs continue to be involved in 172 IPO firms (out of 777 that were VC-backed at the time of IPO) five years after the listing. Hence, it is likely that the length of VC presence could have a significant impact on important corporate decisions. A second reason why the number of observations decreased over the years was because the more recent IPOs were excluded in later years; e.g., an IPO from 2015 was dropped

[3] Part of the drop in the first year can be explained by the expiration of the lockup period for major shareholders (Brav and Gompers, 2003), which typically lasts up to 180 days (6 months). During the lockup period, they are not allowed to sell. However, as it will become evident from our summary statistics (Appendix Table 2), this lockup period had no impact on our analysis, since the corporate decisions we examined took place on average 6-9 years after the IPO for VC-backed firms, which is well after the expiry of the lockup period. We manually checked whether some firms made any of their corporate decisions within the first year after the IPO, and there were none.

after year 4 in the table, because we did not have any information about the future actions of this IPO firm.

Please insert (Table 1 here)

Table 2 shows the percentage of VC and non-VC-backed IPO firms that initiated dividends, conducted a first acquisition, and issued first corporate bonds and seasoned equity after the listing. Values reported were cumulated up to the reported year. The cumulative proportion of VC-backed IPOs is lower than non-VC-backed IPOs from year 1 to year 10 for dividend initiation and first seasoned equity offering. For the two others, there is almost no difference. Over the first 10 years of listing, the cumulative percentage of VC-backed IPOs initiating dividends was 30 percentage points lower than for their non-VC-backed counterparts. Over the same period, the proportion of firms engaged in their first M&A activity was around 21% for the joint sample and the proportion issuing their first bonds was 39% for the joint sample. As regards the first seasoned equity offering, the proportion was 49.5% for VC-backed and 71.2% for non-VC-backed IPOs at the end of the first 10 years of listing. It is therefore the opposite of what we predicted for equity; in the multivariate analysis, this difference is no longer significant. For the first M&A and first bond issuance, we also predicted a significant difference. The univariate analysis therefore only offers partial support of the firm life-cycle hypothesis.

Please insert (Table 2 here)

Next, we examined the characteristics of the IPO firms in different cross-sectional settings. Table 3, Panel A reports the mean and median values of the firm and IPO characteristics for different

years and sub-samples. First, we reported the values at the time of the IPO (Year 0), one year after the IPO (Year 1), the year of DI, the year of first M&A, and the year of first corporate bond and equity issuance. Comparing the sample sizes, one can see that 39% (548 out of 1,409) of IPO firms in our full sample had a DI, 16% (223 out of 1,409) did a first M&A, 27% (375 out of 1,409) issued corporate bonds, and 40% (567 out of 1,409) did a seasoned equity offering during our sample period.

The table shows that the mean (median) VC holding is 13.9% (0%), while the mean (median) number of VCs involved in IPO firms is 1.38 (0). These values are lower than in Table 1, where they are calculated for the full sample of VC-backed and non-VC-backed firms. During the year of listing, the mean age of the IPO firm was 12.78 years and the median 11.92 (values not explicitly reported in Table 3, where we reported statistics for *ln(Firm age)*). The mean age of the IPO firms was consistent with Krishnan et al. (2011). On average the ratio of R&D expenditure to total asset was 14.6%, with a median of 10.8%, which is somewhat higher than that reported by Kale, Kini, and Payne (2012). The operating margin was negative 2.1% for the IPO firms, while the median was positive 6.3%.[4] The negative mean and positive median suggest that the operating profit of the IPO firms was skewed to the left. The dividend premium measures the premium placed by investors on dividend paying stocks in the market. It is calculated as the difference between the logarithms of the market-to-book ratios for each year

[4] Our variable of operating margin, called operating income (scaled by total asset in the analysis) and used by Kale, Kini, and Payne (2012), is quite similar to earned/contributed capital mix used in DeAngelo, DeAngelo, and Stulz (2006). They proxy the mix by the ratio of retained earnings over total assets (or retained earnings over total equity) and is meant to capture a firm's operating lifecycle. Their variable and ours is highly correlated, so we only include one in our multivariate analyses.

and for all dividend and non-dividend paying firms in the market. The mean and median dividend premium was -7.059% and -8.530% respectively. This indicates a stock price premium for non-dividend paying firms during our sample period. A negative dividend premium for dividend initiating firms has also been documented in previous studies (see Kale, Kini, and Payne, 2012). Only 30% of the IPOs in our sample were listed at the New York stock exchange, while 11.9% of the IPOs were listed during the financial crisis. The average ranking of underwriters at the time of listing was 7 and the median was 8, consistent with Krishnan et al. (2011). The mean institutional holding during the IPO year was 43.1%; a year prior to DI it was 48%, which is somewhat higher than the value of 36% reported in Kale, Kini, and Payne (2012).

The characteristics of the IPO firms remained qualitatively similar one year after IPO except for VC holding, where the proportion of VC holding decreased by 55.3% (from 13.9% to 7.7%). During the year of dividend initiation, the IPO firms were older and more profitable (as shown by positive operating margins). VC funds tended to hold 4.2% on average when the IPO firm initiated dividend payments. There were no substantial differences in IPO firm characteristics between the year of dividend initiation, the first year of acquisition, the first year of issuing corporate bond or equity to the public, even as regards VC holding. Indeed, the VCs maintained a holding of 4% on average when the IPO firm initiated its first dividend payment, first M&A, and issued its first corporate bonds. The only exception was for seasoned equity offerings, where the mean VC holding was 7.3%. This difference for seasoned equity offering was consistent with the observation in Table 2 that it occurs much earlier than any other corporate decision.

Panel B of Table 3 shows the market reactions around the announcement, for the same samples. The market reacted positively between 1 and 2% to DI, first M&A and first corporate bond issuance over a (-1, +1) and a (-2, +2) window. For the first seasoned equity issuance, the market however seemed to react negatively in both the (-1, +1) and the (-2, +2) window by 1.5 and 1.2% respectively.

Finally, we examined differences in mean announcement returns between VC-backed and non-VC-backed IPOs for the various events. Panel C shows that announcement returns were positive for the VCs and significantly higher than for non-VC-backed IPOs over 3- and 5-day windows, except for the equity issue. These positive effects were consistent for DI, first M&A and first corporate bond issuance. Nonetheless, for the equity issue, the announcement returns were negative for all IPOs, but the negative impact was smaller for VC-backed than for non-VC-backed IPOs. These different findings are consistent with our prediction that the presence of VC firms during these important corporate events adds credibility to the company's decisions and timing.[5]

Please insert (Table 3 here)

3.2 Multivariate analysis on corporate decisions

[5] Appendix Table 2 shows the descriptive statistics for the full sample (panel data) and the sub-sample of VC-backed and non-VC-backed IPO firms at the time of listing. Moreover, Appendix Table 3 provides a list of the 10 most active VC firms in our sample, by number of post-IPO involvement.

In this section, we examine in a multivariate setting the impact of VC holdings and the number of VCs involved in the IPO firm on the time to the different corporate events, starting with dividend initiation.

Time to dividend initiation

Table 4 reports the results of the time to dividend initiation using the AFT model. We added various market and firm characteristics to the specifications to control for any possible differences between VC-backed and non-VC-backed IPO firms. To deal with the alternative hypothesis that differences in timing may be due to the fact that VC-backed firms are simply younger and possibly still in a less mature stage, we controlled for firm age, market-to-book ratio, R&A/TA, and operating income, among other things. We further included interactions between industry and year dummies in all the specifications, to capture the effect of possible technological waves on the VC-backed industries that could affect industry dummies differently across the years. Industry dummies were based on the Fama-French 12 industry classification. Model 1 shows the baseline regression using only VC holding, while Model 2 shows the impact of VC holding controlling for IPO characteristics only and Model 3 controls for IPO and market characteristics. A positive coefficient suggests that the covariates accelerate the time, while a negative coefficient indicates that the independent variables shorten the time to dividend initiation. Model 1 shows that VC holding had a positive impact on the time to dividend initiation, leading to a longer time to dividend initiation. The positive effect of VC holding persisted in Models 2 and 3 even when controlling for IPO firm and market characteristics. According to Model 3, a one-STD increase in VC holding delays the average time to dividend

initiation by 1.06 years.[6] In addition to VC holding, firm and market characteristics influence the time to initiate dividends. For instance, high leverage postpones the time, while firm age shortens the time to dividend initiation. A highly levered firm has a strong commitment to pay out cash to lenders, which limits its possibility to pay out dividends. The result on firm age is consistent with the fact that more mature firms have more stable cash flows and fewer investment opportunities, leading to greater capacity to pay out dividends. The time to initiate dividend is also influenced by other factors such as institutional holding in the IPO firm, general market conditions (as measured by the market volume), and whether the IPO is underwritten by reputable underwriters.

In Models 4 to 6, we used the number of VCs instead of their holding. Similarly, the number of VCs involved in IPO firms tended to postpone the time to dividend initiation. Stated differently, the higher the number of VCs prior to dividend initiation, the longer it took for the firm to initiate dividend. For instance, in Model 6, the coefficient of *VC number* is 0.032. This indicates that an increase in the number of VCs by one unit delays the average time to dividend initiation by 0.0325 years (i.e., approximately 3 months). The magnitude of the coefficient is relatively small compared to a one-STD increase in VC holding, suggesting that the total of VC holdings has a dominant effect on the time to dividend initiation as compared to the number of VCs. Overall, the results from Table 4 show that the number of VCs involved in the IPO firms and their holding influence the decision to initiate dividends. In other words, the time to dividend initiation is longer when the number of the VCs is higher or their holding prior to dividend initiation is greater.

[6] i.e., exp(0.261*0.208), where 0.261 is the coefficient of VC holding using the AFT model, and 0.208 is the STD of VC holding calculated from the panel-data sample reported in Appendix Table 2.

Please insert (Table 4 here)

Time to first M&A, corporate bond issuance, and seasoned equity offering

The results of Table 4 show that VC holding and VC number delay the time to dividend initiation. The decision to acquire, issue bonds, or offer seasoned equity are also important corporate decisions in a firm's life cycle. We next aimed to shed light on the influence of VC holding or the number of VCs involved in the IPO firms on these important corporate decisions. In Table 5, we first examined how VC holding and VC number affect the time to first M&A (Models 1 and 2), time to issue corporate bonds (Models 3 and 4), and time to issue first seasoned equity (Models 5 and 6).

The results of Table 5, Model 1 show that one-STD increase in VC holding delays the average time to become an acquirer by 1.05 years, when controlling for firm and market characteristics. Similarly, a unit increase in the number of VCs involved in the IPO firm lengthens the average time to acquire by 0.078 years, which is equivalent to 9 months. For the decision to issue first corporate bonds, both VC holding and VC number appear to postpone the decision. For instance, a one-STD increase in VC holding delays the time to issue the first bond by 1.04 years compared to a delay of approximately 3 months for a unit increase in the number of VCs involved in the firm. For seasoned equity offerings, we find no significant impact on any of the two measures. Taken together, the results of Table 5 show that VCs appear to delay the time to acquire, issue corporate bond, but have no impact on seasoned equity offering. VC involvement therefore has a significant impact on key corporate decisions post-listing. VCs appear to extend the growth

phase of the firm's life cycle. The fact that we do not find significant results for seasoned equity could be because larger issuances were made by VC-backed IPO firms. In this paper, we focus on the timing for conducting seasoned equity offering, while the issue of the amount raised is beyond the scope of this paper. However, it could explain the absence of a difference observed here.

Please insert (Table 5 here)

Robustness checks

So far, we have assumed that VC participation directly affects important corporate decisions such as dividend initiation, first M&A, corporate bond issuance, and seasoned equity offering. Presumably, VCs could have simply selected firms that were more prone to such changes, leading to reverse causality. To disentangle this possible endogeneity issue, we used the entropy balancing method following Chapman, Miller, and White (2019). Specifically, we tested whether the impact of VC holding on these events could be explained by observable differences in IPO firm characteristics. Typically, entropy balancing achieves balanced covariates between VC-backed (treatment) and non-VC-backed (control) IPO firms along several determinants.[7] Unlike Propensity Score Matching (PSM), the entropy balancing technique preserves our full sample and ensures the balance of our covariates between treatment and control observations by re-weighting observations such that the post-weighting mean and variance for both the treatment

[7] We chose the entropy balancing method over the propensity score matching approach, because the later reduces the sample size when compared to the former, due to imbalance of observations between treatment and control group.

and control group are identical based on the different firm characteristics. The entropy method works by first determining the distributional properties (i.e., mean and variance) of the treatment observations. These distributional properties become the target distributional properties of the post-weighting control sample (the balance conditions). The algorithm proceeds by first assigning possible weights to control observations and then testing whether the balancing conditions are satisfied (i.e., the distributional properties of treatment and post-weighted control observations are identical). This process is repeated over multiple iterations until a set of weights is found that satisfies the balance conditions. While the control observations are assigned a positive weight that may be greater or less than 1, the treatment observations are not re-weighted and retain their default weighting of 1. In addition, entropy balancing has higher model efficiency and less first-stage model dependency than PSM (Hainmueller, 2012).

The multivariate results using the balanced sample are reported in Table 6 and are consistent with the results of our baseline analysis in Tables 4 (Model 3) and 5 (Models 1, 3, and 5) when controlling for endogeneity.[8] Note that here again we included interacted industry-year fixed effects in all our specifications. The results of Table 6 show that *VC holding* has a positive impact on (thus, delays) time to DI, first M&A, and first bond issuance, and no impact on the time to first seasoned equity offering, using the matched sample. These results suggest that VC holding has an influence on important corporate decisions that are linked to a firm's life cycle.

[8] We used eleven variables for the entropy balancing matching processes. Appendix Table 4 reports the descriptive statistics of our matching variables for VC-backed and non-VC-backed IPO firms post-entropy balancing. These statistics confirm that our treatment and control samples are well balanced.

Note that all firm characteristics have become non-significant in all the regressions (except some at 10% level) as a result of the good matching process.

Please insert (Table 6 here)

We further carried out three additional robustness checks that are summarized in Table 7 and Appendix Table 5 (Panels A to C). The first was related to the sample of IPO firms used in the analysis. For firms that had their IPO towards the end of the sample period, we have very few observations to explain the different corporate decisions. While the AFT models control for that by explicitly labeling them as right-censored, it may nevertheless affect the results. To rule this out, we re-ran the analysis on the timing of corporate events for the subsample of IPO firms that went public until 2015 and excluded those that had their IPO in 2016, 2017, or 2018. Table 7 reports the results for DI, using the same specification as in Table 4. Results for the other corporate events are reported in Appendix Table 5. We drew similar conclusions, with somewhat larger economic effects than with the full sample. Second, to further strengthen our confidence that our results were not driven by the possible alternative hypothesis that VC firms take their portfolio companies earlier to a public listing, we re-ran the analysis on the subsample of VC-backed IPO firms only. If VC firms really influence corporate events, we expected our conclusions to also hold within the subsample of VC-backed IPOs. This would also suggest that our results are not driven by this alternative hypothesis. Results are shown in Models 2 of Table 7 and Appendix Table 5, which indicate that our results hold within the subsample of VC-backed IPO firms. And third, we re-ran the analysis with an alternative measure of VC participation. Instead of using the percentage of ownership or the number of VCs, we constructed a dummy

variable equal to 1 if there was VC participation, regardless of the extent, and 0 otherwise. We found similar results for all corporate events (see Models 3 in Table 7 and Panels A to C of Appendix Table 5). Finally, we controlled for sample selection due to the difference between VC-backed and non-VC-backed IPOs. First, we estimated the probability of being backed by VC firms using a probit model. Next, we calculated the inverse mills ratio and included it in our AFT model as an additional control variable. A significant mills ratio in the AFT model would suggest a sample selection bias, while an insignificant mills ratio indicates the absence of sample selection bias. Model 4 in Panels A and B of Table 7 shows the results that clearly indicate that sample selection is not a concern as the coefficient of mills ratio is insignificant. Hence, our results are robust when controlling for sample selection.

Please insert (Table 7 here)

Finally, we checked for alternative estimation models in Appendix Table 6. We found that our results were robust using the Probit and Cox proportional hazard models as alternative estimation models, and the impact of VC holding and VC number (the main variables of interest) on dividend initiation remained significant and robust.

Endogeneity tests using alternative model specifications

Our results show that endogeneity is not a concern when using an entropy balancing method. Nevertheless, it can be argued that *VC holding* is influenced by the time to corporate events,

which suggest a possible reverse causality problem. The AFT and Cox models do not accommodate two-stage endogeneity models. Hence, we used a two-stage instrumental variable Tobit model (IV Tobit) as an alternative to control for possible endogeneity. Unlike IV OLS regression, the IV Tobit model can handle date censoring, which is the key feature of the AFT or Cox model framework. We used the hot issue market proxy (measured as the average initial returns of IPOs issued during the three months prior to the month of the IPO) similar to Demers and Joos (2007) as determinant of the VC holding. For instance, a hot issue market could encourage VC firms to sell their shares quickly post listing and hence, would be likely to influence VC holding in the IPO companies shortly after the public listing took place. By contrast, the time to corporate events might not be strongly correlated to the hot issue market because of the length of time elapsed between the listing date and the date of the events. In stage I of the IV Tobit, we used the hot issue market as the determinant of VC holding together with the other characteristics. We used the instrument in stage II, as the determinant of the logarithm of the time to dividend initiation, first M&A, first bond issue or first seasoned offering. Table 8 reports the second stage results of the IV Tobit, while the first stage results are reported in Appendix Table 7. It is evident from Table 8 Models 1 to 4 that VC holding delays the time to corporate events when controlling for possible endogeneity due to reverse causality. Using the Wald test for endogeneity, we did not reject the null (which suggests that endogeneity is not a concern) at the 5% conventional level. Overall, the results of Table 8 are in line with the results reported in Tables 4 and 5 and indicate that our results are not subject to reverse causality concerns.

Please insert (Table 8 here)

Implications for cash position, investments, and R&D expenses

As a final insight, it is useful to explore how various accounting figures, such as cash position, investments, and R&D expenses, evolve over the same time period. We used WRDS/Compustat to extract this additional information. Indeed, the corporate decisions in our study deal with payout policy (dividend) and external financing decisions, which directly impact the availability of cash and are also driven by other decisions such as investments. Note that we are not making any causal claims, but simply reporting how these accounting figures evolved over the same period.

We found that VC-backed IPO companies in which VCs are still involved hold significantly less cash. This was confirmed even when compared with industry averages. In contrast, they have significantly higher short-term investments and R&D expenses during the years after IPO. These findings are consistent with the overall findings of this study that VC funds stay in companies after the IPO to extend the growth phase through more investments and R&D activities, which in turn reduces cash holdings. While we do not report these results, they are available upon request from the authors.

3.3 Stock market reactions

As shown in Tables 4 and 5, we found that VCs play an important role in the key corporate decisions. They tend to affect the timing of these decisions significantly. Still, these decisions are

often made while VC funds remain involved. This is even truer for dividend initiation. Hence, it remains an open question whether the market reacts more favorably in their presence at the time of announcement if it signals that the IPO firm is still in its growth phase. In Table 9, we examined the influence of VC holding and VC number on market reactions. To measure market reactions, we used cumulative abnormal returns (CAR) over a 3-day window (-1 to +1) and a 5-day window (-2 to +2)[9] around the announcement of each corporate event for the IPO firms. The CAR is calculated using a market model with a value weighted market index. The sample size varied depending on the different corporate decisions, since all IPO firms did not initiate most of these events.

Table 9 reports a positive CAR over the 3-day window. Model 1 shows that a one-STD increase in VC holding increases the CAR by 0.31%, while a one-unit increase in VC number (Model 2) increases the CAR by 1.3%. We controlled for IPO and market characteristics a year prior to the corporate event in all the models.

Models 3 to 4 show the impact of VC holding and VC number on CAR around the first M&A announcement. A one-STD increase in VC holding increases the CAR by 0.49% over a 3-day window. By contrast, the CAR increases by 1.1% with a one-unit increase in the number of VCs. Models 5 to 6 show market reactions to the first corporate bond issuance. A one-STD increase in *VC holding* enhances the announcement returns by 0.71% (Model 5) over a 3-day window. The impact of *VC number* (i.e., Model 6) on CAR is 1.3% with a one-unit increase. For first seasoned

[9] Appendix Table 8 reports the results of the 5-day window.

equity issuance announcements, neither *VC holding* nor *VC number* significantly influenced the announcement returns (i.e., Models 7 to 8).

Overall, the results of Table 9 show that, despite the fact that VCs affect the timing of major corporate life-cycle decisions, the market seems to favor such an outcome and reacts positively at the time of their announcement. Thus, while many of these decisions have been shown to induce a negative stock market reaction on average, the fact that VC funds are involved provides a positive signal. The results also suggest that the market recognizes the importance of VC influence in delaying these decisions.

Please insert (Table 9 here)

In Table 10, we tested whether our result on the market reaction of DI still held when controlling for the presence of other institutional investors. Previous studies have shown that their presence also affects market reaction, although for different reasons than certification (e.g., Kale, Kini, and Payne, 2012). In order to be comprehensive in this robustness test, we hand-collected information on the type of investor in order to classify the proportion that was active versus passive, following the methodology proposed by Almazan, Hartzell, and Starks (2005).[10] Under their definition, active institutional investors are those who actively monitor through their voice rather than taking over the firm. Similar to Table 9, we measured the announcement returns over 3-day and 5-day windows. The results in Table 10 show that coefficients of *VC holding* remain positive with a similar magnitude despite the inclusion of control for institution investors. An

[10] Please see detailed definitions of active and passive in the Appendix Table 1.

increase in institutional ownership at the time of announcement also had a positive effect, consistent with Kale, Kini, and Payne (2012). The overall finding of Table 10 is that the market reacts positively to VC holdings around DI even in the presence of active and passive institutional holdings, which offers evidence that VC presence has a distinct effect from institutional investors.

Please insert (Table 10 here)

3.4 VC characteristics

Drawing from the analysis of the previous sections, it is evident that VC involvement plays a role in the life cycle of corporate decisions. It is possible that the influence of VC firms on IPOs might be driven by the VC characteristics at the time of such important corporate decisions. As a final test we examined whether the VC firms that stayed until corporate events took place were different from those that left soon after the IPO. As evidenced in Table 1 above, some VC firms left within the first two years or so, while others stayed longer post IPO. This could suggest that less experienced VC firms belong to the first group, while more experienced ones stay much longer to continue helping the firm to develop. That may further explain why the market reacts positively to some of the corporate events in the presence of VC firms on the board of directors.

To shed light into this possibility, we hand-collected more detailed information on VC characteristics for VC-backed IPO firms in our sample. Summary statistics are presented in Table 11. For each corporate event, they show means of the number of VC firms involved, the average VC firm age, and the percentage of them holding a board seat. At the time of IPO, the

sample shows that on average there were 2.6 VC firms involved, with an average age of 21.35 years, and 32.5% held a seat on the board of directors. Thus, the VC firms were on average well experienced and often actively involved in the companies (although not all, since typically one VC firm acts as lead investor). More importantly, the values are not significantly different between the time to IPO and the time to any of the corporate events, with one exception only for the time to first bond issuance. Thus, while the number of VC firms involved in IPO companies declined over time after flotation, the characteristics of the VC firms that stayed longer with the IPO firm remained stable on average. Therefore, this would suggest no particular difference in the characteristics of the group of VC firms between those that left early and those that left later.

Please insert (Table 11 here)

In order to exploit further this additional information, we examined the effect of VC characteristics on market reactions at the time of dividend initiation announcement. Consistent with the VC certification theory advocated before, we expected these additional variables to have a positive impact, as they capture increased VC reputation and involvement. Results are shown in Table 12 for CARs over 3-day and 5-day windows. Model 1 shows that a one-STD increase in the percentage of VC directors on the board increases the CAR by 0.456% (standard deviation of the VC directors variable is 19%), while a one-STD increase in the logarithm of the average age of VC firms (Model 2) increases the CAR by approximately 1.00% (standard deviation of ln VC age is 0.798). In Models 3 and 4, we used the 5-day window around the dividend initiation announcement. The results are consistent and show similar levels of economic significance. We controlled for IPO and market characteristics a year prior to the dividend initiation in all the

models. Overall, the results of Table 12 show that when the VCs are more experienced (as measured by VC firm age) and hold board seats, the market reacts more positively to the dividend initiation announcement. This in turn indicates that VC certification is strongest for reputable and more heavily involved VC firms, consistent with earlier studies on VC certification effects at the time of IPO. We found that these results extended to important corporate events when VCs remained involved post-IPO.

Please insert (Table 12 here)

4. Conclusion

While it is often assumed that VC firms use the IPO process as a means to exit, in practice VC firms often remain as shareholder and on the board of directors of companies well after they have gone public. This paper shows that VC ownership beyond the IPO listing impacts important corporate decisions in a firm's lifetime. In particular, we found that VC firms delay the time to initiate dividends, the use of external growth strategies (through acquisitions), and the introduction to the corporate bond market. These different results are consistent with the firm financial life-cycle theory. Moreover, we show that the presence of VC firms at DI leads to a positive abnormal stock market reaction, suggesting that their presence can alleviate the negative market response of DI. Similar evidence is found for the decision to make its first M&A and issue its first bonds.

Our study contributes to the literature on the firm financial life-cycle explanation by extending it to important corporate decisions other than dividend payout (DeAngelo, DeAngelo, and Stulz, 2006) and acquisition (Owen and Yawson, 2010). Grennan (2019) finds that the decision to initiate dividend is due to a peer influence within the same industry, while our study shows that the presence of VC funds influences dividend initiation and other corporate decisions. We contribute to the understanding of how VC funds help their portfolio companies to grow, and we show that their capacity to deal with information asymmetry problems extends beyond the initial stage and the IPO certification, to the post-IPO life of the firm. We also add to the literature on VC exits through different routes (Cumming, 2008), by demonstrating that they remain with their portfolio companies after the IPO is conducted. In line with other recent studies (e.g., Iliev and Lowry, 2020), our findings are consistent with the view that VC funds continue associations with their portfolio companies post-IPO listing. In particular, our study complements other studies by showing how VC fund involvement affects important corporate decisions associated with the firm's life cycle.

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Table 1: Descriptive statistics for VC holding

This table shows VC holding of VC-backed firms from the IPO year (year 0) to 10 years post-IPO. The mean and median values of *VC holding* and *VC number* are reported for each year for the sample of firms that have at least one VC as shareholder, leading to a sample size reduction over time. The variables are defined in Appendix Table 1.

		VC holding		VC number	
Post-IPO year	Number of observations	Mean	Median	Mean	Median
0	777	0.297	0.270	2.967	3
1	489	0.193	0.150	2.794	2
2	416	0.139	0.092	2.493	2
3	332	0.106	0.059	2.181	2
4	246	0.094	0.050	2.027	2
5	172	0.082	0.020	1.828	1
6	111	0.075	0.019	1.731	1
7	83	0.075	0.021	1.587	1
8	73	0.059	0.016	1.424	1
9	59	0.062	0.020	1.346	1
10	47	0.050	0.011	1.487	1

Table 2: Descriptive statistics for the timing of events

This table shows the percentage of the sample of VC-backed and non-VC-backed IPO firms that initiated a specific event for the first time, *cumulated* up to Year 10 after the IPO. For instance, 25.327% of all VC-backed IPO firms initiated dividend payouts within the first 5 years after their IPO. The sample considered for the calculations only includes IPO firms for which we have the period of observation needed (e.g., for Year 10, we excluded all IPOs after 2007, since we could only observe their decisions for the first 9 years). The variables are defined in Appendix Table 1.

	Dividend initiation		First M&A		First bond issuance		First seasoned equity issuance	
Post-IPO year	VC (%)	Non-VC (%)	VC (%)	Non-VC (%)	VC (%)	Non-VC (%)	VC (%)	Non-VC (%)
0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1	3.047	15.704	4.633	3.481	14.028	13.608	16.154	25.606
2	9.236	19.362	7.412	5.769	18.336	17.147	23.271	34.185
3	14.168	25.383	9.840	7.516	21.676	21.078	28.093	40.625
4	18.497	33.080	12.500	9.710	24.148	23.169	31.068	45.363
5	25.327	44.113	14.422	12.454	28.526	27.323	36.632	52.229
6	30.828	54.164	16.667	15.481	32.292	32.008	41.855	60.016
7	34.127	58.799	18.378	17.802	34.414	34.945	44.783	64.989
8	35.839	62.329	19.450	18.889	35.780	37.111	46.060	67.019
9	40.742	70.268	21.415	20.413	38.623	38.532	48.711	69.846
10	42.360	73.256	21.857	21.395	39.265	39.302	49.516	71.163

Table 3: Descriptive statistics for the full sample of IPO firms (cross-sectional data)

Panel A of this table provides descriptive statistics (mean and median) for all the variables. Panel B provides statistics of CAR for two different windows. Statistics are provided each time for different subsamples; i.e., Year 0 (IPO year), Year 1 (one year after IPO), Year of DI, Year of first M&A, Year of first bond issuance, and Year of first seasoned equity issuance. Panel C provides statistics of CAR for VC- and non-VC-backed-firms for different windows. All the variables are defined in Appendix Table 1.

	Year 0			Year 1			Year of DI			Year of first M&A			Year of first bond issuance			Year of first seasoned equity issuance		
Panel A	N	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median
VC holding	1409	0.139	0.000	1171	0.077	0.000	548	0.042	0.000	223	0.041	0.000	375	0.046	0.000	567	0.073	0.000
VC number	1409	1.380	0.000	1171	1.114	0.000	548	0.677	0.000	223	0.801	0.000	375	0.979	0.000	567	1.060	0.000
Firm size	1409	5.443	5.184	1171	5.475	5.319	548	5.914	5.902	223	5.778	5.812	375	5.693	5.616	567	5.819	5.684
Leverage	1409	0.441	0.350	1171	0.411	0.3010	548	0.344	0.251	223	0.326	0.243	375	0.294	0.241	567	0.336	0.278
Market-to-book ratio	1409	4.650	3.613	1171	3.985	2.826	548	3.985	2.933	223	4.477	2.749	375	3.663	2.987	567	3.442	3.634
Ln(Firm age)	1409	2.447	2.303	1171	2.456	2.303	548	2.723	2.708	223	2.526	2.485	375	2.552	2.485	567	2.620	2.485
R&D/TA	1409	0.146	0.108	1171	0.183	0.127	548	0.204	0.116	223	0.158	0.116	375	0.255	0.190	567	0.178	0.107
Operating income	1409	-0.021	0.063	1171	0.026	0.075	548	0.066	0.096	223	0.003	0.046	375	0.023	0.077	567	0.048	0.092
Dividend premium (%)	1409	-7.059	-8.530	1171	-4.763	-5.384	548	-7.296	-8.785	223	-5.348	-6.188	375	-5.965	-6.686	567	-6.212	-6.686
Turnover	1409	3.808	2.786	1171	4.007	2.786	548	3.815	2.786	223	4.920	2.786	375	3.570	2.786	567	3.687	2.786
NYSE listing	1409	0.305	0.000	1171	0.265	0.000	548	0.327	0.000	223	0.219	0.000	375	0.241	0.000	567	0.305	0.000
Crisis dummy	1409	0.119	0.000	1171	0.103	0.000	548	0.084	0.000	223	0.117	0.000	375	0.147	0.000	567	0.101	0.000
Underwriter reputation	1409	7.340	8.334	1171	7.435	8.251	548	7.420	8.501	223	7.407	8.101	375	7.281	8.001	567	7.435	8.355
Institutional holding	1409	0.431	0.360	1171	0.484	0.434	548	0.546	0.541	223	0.556	0.552	375	0.538	0.531	567	0.567	0.553

Table 3 continues

Panel B	Year of DI			Year of first M&A			Year of first bond issuance			Year of first seasoned equity issuance		
	N	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median
CAR (-1,+1)	548	0.010	0.005	223	0.015	0.014	375	0.010	0.006	567	-0.015	-0.010
CAR (-2,+2)	548	0.021	0.002	223	0.016	0.021	375	0.017	0.008	567	-0.012	-0. 008

Panel C	Year of DI			Year of first M&A			Year of first bond issuance			Year of first seasoned equity issuance		
	VC	Non-VC		VC	Non-VC		VC	Non-VC		VC	Non-VC	
	Mean	Mean	T-test	Mean	Mean	T-test	Mean	Mean	T-test	Mean	Mean	T-test
CAR (-1,+1)	0.015	0.006	2.01**	0.022	0.009	1.98**	0.014	0.008	2.17**	-0.008	-0.023	-2.07**
CAR (-2,+2)	0.029	0.013	1.87*	0.023	0.007	2.01**	0.021	0.014	1.64	-0.009	-0.016	-1.87*
N	226	322		104	119		174	201		283	284	

Table 4: Determinants of the time to dividend initiation

This table shows the estimation results of the Accelerated Failure Time (AFT) models. The dependent variable is the logarithm of the time to dividend initiation from the date of IPO listing (the variable *Time to dividend initiation*). Models 1 to 3 show the results for *VC holding* and Models 4 to 6 for *VC number*. Interacted industry-year fixed effects are included in all the specifications below. All variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
VC holding	0.781***	0.366***	0.261***			
VC number				0.106***	0.035*	0.032**
Firm size		0.044**	0.056***		0.072**	0.571***
Leverage		0.251**	0.106**		0.216***	0.125***
Market-to-book ratio		0.037	0.068**		0.031	0.066**
Ln(Firm age)		-0.217***	-0.234***		-0.219***	-0.238***
R&D/TA		0.016	-0.018		0.015	-0.019
Operating income		0.029	0.017		0.022	0.011
Dividend premium		0.001	0.002		0.001	0.002
Turnover			0.091**			0.088*
NYSE listing			-0.036			-0.045
Institutional holding			0.191***			0.116***
Underwriter reputation			0.029***			0.027***
Interacted industry-year dummies included	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	8,007	8,007	8,007	8,007	8,007	8,007
Log likelihood	-5515.7	-5461.8	-5376.7	-5449.8	-5394.3	-5309
Chi-squared	855.3	1429.3	1041.7	812.9	1394.0	1014.6

Table 5: Determinants of the time to first M&A initiation, bond, and equity issuance

This table shows the estimation results of the AFT models. The dependent variable is the logarithm of *Time to first M&A* for Models 1 and 2, *Time to first bond issuance* for Models 3 and 4, and *Time to first seasoned equity issuance* for Models 5 and 6. Interacted industry-year fixed effects are included in all the specifications below. All variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	Time to first M&A		Time to first bond issuance		Time to first seasoned equity issuance	
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
VC holding	0.228***		0.185***		0.011	
VC number		0.076***		0.037***		0.012
Firm size	0.087***	0.084***	0.067***	0.070***	0.148***	0.147***
Leverage	0.075**	0.107**	0.067**	0.096**	0.224***	0.218***
Market-to-book ratio	0.022*	0.017*	0.018*	0.017*	0.164**	0.171**
Ln(Firm age)	-0.188***	-0.186***	-0.040***	-0.040***	-0.019*	-0.018*
R&D/TA	-0.052***	-0.047**	-0.058**	-0.064**	-0.319***	-0.318***
Operating income	0.019*	0.013*	0.032**	0.032*	0.077**	0.077**
Dividend premium	0.002	0.001	0.001	0.007	0.003	0.002
Turnover	0.172***	0.173***	0.148***	0.147***	0.296***	0.291***
NYSE listing	-0.402***	-0.412***	-0.097***	-0.102***	-0.191***	-0.192***
Institutional holding	0 .082*	0.053*	0.248***	0.246***	0.152***	0.142***
Underwriter reputation	0.079***	0.076***	0.015*	0.021*	0.026**	0.024**
Interacted industry-year dummies included	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	8,007	8,007	8,007	8,007	8,007	8,007
Log likelihood	-26217.7	-25890.4	-42520.4	-42018.8	-48495.7	-47988.5
Chi-squared	1001.1	987.7	3265.2	3153.5	2447.5	2416.4

Table 6: Determinants of corporate decisions, controlling for endogeneity (entropy balancing method)

This table shows the estimation results of the AFT models when matching VC- with non-VC-backed IPO firms using the entropy balancing method. The dependent variable is the logarithm of *Time to DI* for Model 1, *Time to first M&A* for Model 2, *Time to first bond issuance* for Model 3, and *Time to first seasoned equity issuance* for Model 4. Interacted industry-year fixed effects are included in all the specifications below. All variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	DI	First M&A	First bond issuance	First seasoned equity issuance
Variables	Model 1	Model 2	Model 3	Model 4
VC holding	0.285***	0.196***	0.189***	0.064
Firm size	0.057*	0.084*	0.073*	0.055*
Leverage	0.014	0.004	0.003	0.011
Market-to-book ratio	0.026	0.025	0.018	0.030
Ln(Firm age)	-0.023*	-0.019*	-0.040*	-0.019*
R&D/TA	-0.018	-0.011	-0.015	-0.013
Operating income	0.017	0.009	0.003	0.007
Dividend premium	0.002	0.002	0.001	0.000
Turnover	0.019	0.017	0.014	0.029
NYSE listing	-0.036	-0.024	0.019	-0.011
Institutional holding	0.059*	0.031*	0.0248*	0.052*
Underwriter reputation	0.003	0.007	0.002	0.002
Interacted industry-year dummies included	Yes	Yes	Yes	Yes
Number of observations	8,007	8,007	8,007	8,007
Log likelihood	-5376.7	-26217.7	-42520.4	-48495.7
Chi-squared	1041.7	1001.1	3265.2	2447.5

Table 7: Sample selection and additional robustness checks

This table shows the estimation results of the Accelerated Failure Time (AFT) models for various subsamples of the data and alternative measures. The dependent variable is the logarithm of the time to dividend initiation from the date of IPO listing (the variable *Time to dividend initiation*). Model 1 shows the results for the subsample of IPO firms that made their IPO up to 2015 (therefore excluding those who made the IPO in subsequent years). Model 2 shows the results for the subsample of VC-backed IPO firms only. Model 3 uses the full sample but with an alternative measure of VC presence based on a dummy variable equal to 1 if at least one VC is participating. Model 4 shows the results when controlling for a sample selection effect due to IPOs being backed or not by VC firms (the first regression estimates VC holding, as shown in Appendix Table 7). Interacted industry-year fixed effects are included in all the specifications below. All variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	Subsample up to 2015	Subsample of VC-backed only	VC-backed indicator	Subsample of VC-backed only (sample selection effect)
Variables	Model 1	Model 2	Model 3	Model 4
VC holding	0.251***	0.291***		0.290***
VC Dummy			0.142***	
Firm size	0.057***	0.094*	0.051***	0.101*
Leverage	0.321***	0.244***	0.278***	0.242***
Market-to-book ratio	0.069**	0.014*	0.071**	0.016*
Ln(Firm age)	-0.024***	-0.038*	-0.021***	-0.039*
R&D/TA	-0.019	-0.013	-0.024	-0.014
Operating income	0.031	0.033	0.013	0.031
Dividend premium	0.002	0.001	0.003	0.001
Turnover	0.096*	0.083*	0.068*	0.082*
NYSE listing	-0.037	-0.197**	-0.035	-0.196**
Institutional holding	0.129***	0.137***	0.118***	0.138***
Underwriter reputation	0.032***	0.020**	0.0268***	0.025**
Mills ratio				0.021*
Interacted industry-year dummies included	Yes	Yes	Yes	Yes
Number of observations	7,900	4,230	8,007	4,230
Log likelihood	-5248.8	-2489.9	-5374.7	-2491.2
Chi-squared	1050.5	1173.2	1044.7	1164.2

Table 8: Instrumental variable Tobit model to control for endogeneity

This table shows the second stage estimations of the IV Tobit models used to control for possible endogeneity related to VC holding. The dependent variable is the logarithm of *Time to DI* for Model 1, *Time to first M&A* for Model 2, *Time to first bond issuance* for Model 3, and *Time to first seasoned equity issuance* for Model 4. The first stage results are reported in Appendix Table 7. Interacted industry-year fixed effects are included in all the specifications below. All variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	Second Stage: IV Tobit model			
	Time to DI	Time to first M&A	Time to first bond issuance	Time to first seasoned equity issuance
Variables	Model 1	Model 2	Model 3	Model 4
VC holding (instrument)	0.312***	0.235***	0.189***	0.083*
Firm size	0.075**	0.099***	0.088***	0.153***
Leverage	0.246**	0.101**	0.108**	0.341***
Market-to-book ratio	0.082**	0.026*	0.034*	0.112**
Ln(Firm age)	-0.277**	-0.291***	-0.055***	-0.044*
R&D/TA	-0.015	-0.096***	-0.046**	-0.166***
Operating income	0.022	0.027*	0.041**	0.069**
Dividend premium	0.005	0.006	0.004	0.002
Turnover	0.078*	0.145***	0.129***	0.191***
NYSE listing	-0.055*	-0.373***	-0.106***	-0.169***
Institutional holding	0.136**	0 .076**	0.218***	0.180***
Underwriter reputation	0.062**	0.053**	0.019*	0.041**
Interacted industry-year dummies included	Yes	Yes	Yes	Yes
Number of observations	8,007	8,007	8,007	8,007
Log likelihood	-1698.3	-1248.0	-958.6	-1471.2
Chi-squared	518.1	323.7	621.7	23.0
Wald test of exogeneity (p-value)	0.095	0.141	0.177	0.221

Table 9: Stock market reactions to event announcements

This table shows the estimation results of a cross-sectional analysis of announcement returns at the time of first dividend initiation (DI), time of first M&A, time of first bond issuance, and time of first seasoned equity issuance respectively. The dependent variable is the CAR measured over a (-1,+1) window. All other variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	Time of first DI		Time of first M&A		Time of first bond issuance		Time of first seasoned equity issuance	
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
VC holding	0.028***		0.044**		0.063**		-0.002	
VC number		0.013*		0.011***		0.013***		-0.003
Firm size	0.011	0.010	0.016	0.010	0.029	0.010	0.011	0.012
Leverage	-0.005*	-0.011*	-0.041**	-0.051**	-0.011	-0.001	-0.057**	-0.026*
Market-to-book ratio	-0.014*	-0.018*	-0.009***	-0.015***	-0.001	-0.001	-0.026***	-0.007
Ln(Firm age)	0.003	0.001	0.001	0.003	0.004	0.006**	0.001	0.001
R&D/TA	0.081**	0.106**	0.016*	0.068***	0.073***	0.009	0.034**	0.011*
Underwriter Reputation	0.001*	0.002*	0.003*	0.003*	0.007*	0.005***	0.002	0.002
NYSE listing	0.004	0.005	0.001	0.004	0.005	0.004	0.008	0.002
Crisis dummy	-0.007**	-0.014**	-0.026**	-0.046**	-0.013*	-0.026*	-0.047***	-0.042**
Industry dummies included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	548	548	223	223	375	375	567	567
R-square	0.176	0.157	0.153	0.155	0.152	0.238	0.129	0.118

Table 10: Stock market reactions to DI announcements, controlling for active and passive institutional investors

This table shows the estimation results of a cross-sectional analysis of announcement returns around dividend initiation. The dependent variable is the CAR around the time of DI announcement measured over a (-1,+1) and a (-2,+2) window. All other variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	CAR (-1,+1)		CAR (-2,+2)		CAR (-1,+1)	CAR (-2,+2)
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Active institutional holding	0.037**		0.014*		0.036**	0.015*
Passive institutional holding		0.022**		0.018*	0.015**	0.018*
VC holding	0.0328**	0.031**	0.031**	0.032**	0.030**	0.031**
Firm size	0.008	0.006	0.010	0.009	0.010	0.008
Leverage	-0.012*	-0.011*	-0.013*	-0.011*	-0.013*	-0.010*
Market-to-book ratio	-0.016*	-0.014*	-0.013*	-0.013*	-0.018*	-0.017*
Ln(Firm age)	0.001	0.001	0.003	0.004	0.006	0.003
R&D/TA	0.032*	0.072*	0.023*	0.091*	0.025*	0.023*
Underwriter reputation	0.008	0.007	0.006	0.004	0.009	0.005
NYSE listing	0.009	0.006	0.004	0.002	0.005	0.003
Crisis dummy	-0.013*	-0.019*	-0.016*	-0.012*	-0.015*	-0.019*
Industry dummies included	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	548	548	548	548	548	548
Adj-R-square	0.186	0.171	0.181	0.169	0.191	0.188

Table 11: Impact of VC characteristics

The table shows the mean of different VC characteristics at the time of IPO, dividend initiation, first bond issuance, first equity offering, and first M&A, for the full sample of VC-backed IPO firms. The variable *VC number* is the number of VC firms involved at the time of listing or a year prior to the corporate event. *VC age* is measured as the difference in years between the founding date of the VC firm and the IPO year or a year prior to the corporate event. The value reported is the average of all VC firms owning shares at the relevant time. *VC directors* is the percentage of VC firms on the board of directors at the time of IPO or a year prior to the corporate event. The last four columns show p-values of difference-in-mean tests on VC characteristics at the time of IPO relative to an individual corporate event. ***, **, * indicate 1%, 5% and 10 % significant levels.

	VC characteristics					***Differences in means***			
Variables	IPO	DI	First bond issuance	First equity issuance	First M&A	(IPO vs. DI)	(IPO vs. bond issuance)	(IPO vs. equity offering)	(IPO vs. M&A)
VC numbers	2.608	1.844	2.880	2.672	1.844	0.066*	0.866	0.966	0.088*
VC age	21.354	19.541	20.774	18..831	19.471	0.651	0.378	0.251	0.471
VC directors	32.561	29.442	18.145	29.231	28.324	0.751	0.004***	0.197	0.489

Table 12: Stock market reactions to DI announcements, controlling for VC characteristics

This table shows the estimation results of the cross-sectional analysis of announcement returns at the time of dividend initiation. The dependent variable is the CAR around the time of DI announcement measured over a (-1,+1) and a (-2,+2) window. All other variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	CAR (-1,+1)		CAR (-2,+2)	
Variables	Model 1	Model 2	Model 3	Model 4
VC directors	0.024***		0.021***	
Ln(VC age)		0.012***		0.011**
Firm size	0.008	0.011	0.006	0.007
Leverage	-0.011*	-0.010*	-0.012*	-0.009*
Market-to-book ratio	-0.011*	-0.010*	-0.011*	-0.014*
Ln(Firm age)	0.004	0.004	0.002	0.002
R&D/TA	0.088**	0.097**	0.094**	0.094**
Underwriter Reputation	0.002*	0.003*	0.003*	0.001*
NYSE listing	0.005	0.004	0.001	0.003
Crisis dummy	-0.008*	-0.011*	-0.012*	-0.001*
Industry dummies included	Yes	Yes	Yes	Yes
Number of observations	548	548	548	548
R-square	0.192	0.184	0.179	0.175

Appendix Table 1: Definition of variables

This table provides the definition and data source of all variables used in this study.

Variable	Definition	Source
VC holding	Number of shares held by VC divided by total number of shares outstanding	Data on number of shares by VC comes from Thomson Reuters Eikon. Data on total number of shares outstanding comes from CRSP
VC number	Number of VC funds as shareholder	Thomson Reuters Eikon
Proportion of VC directors	Number of VC directors on board divided by total number of directors	Hand collected data from SEC Edgar Database
Ln(VC age)	Average age of VC firms on the board	Hand collected data from SEC Edgar Database
Firm size	Natural logarithm of total assets (AT)	Compustat
Leverage	Total debt divided by total assets (DT/ AT)	Compustat
Market-to-book ratio	Closing price at the end of fiscal year divided by book value per share at the end of fiscal year (PRCC_F/BKVLPS); also called Tobin's Q	Compustat
Firm age	Difference in year between foundation year and observation year	Foundation year comes from Jay Ritter's website
R&D/TA	R&D expenditure divided by total assets (XRD/AT)	Compustat
Operating income	Operating income before depreciation divided by total assets (OIBDP/AT)	Compustat
Dividend premium	Difference between the logarithms of the market-to-book ratios of dividend payers and non-payers	Downloaded from Wurgler's website
Turnover	The ratio of annual trading volume to total number of shares outstanding	CRSP
NYSE listing	Dummy variable equal to 1 if the primary exchange of the issuer is NYSE, and 0 otherwise	SDC
Crisis dummy	Dummy variable equal to 1 if the IPO happened during the crisis years 2007 and 2008, and 0 otherwise	SDC
Underwriter reputation	Average rank of underwriters in the underwriting syndicate	ranks are collected from Jay Ritter's website
Time to dividend initiation (years)	Number of years between IPO and dividend initiation	Dividend data is coming from Compustat
Time to first M&A (years)	Number of years between IPO and the first acquisition with minimum value of $10 million	M&A data comes from SDC

Table continues

Time to first bond issuance (years)	Number of years between IPO and the first date of issuing corporate bonds	Debt data comes from SDC
Time to seasoned equity issuance (years)	Number of years between IPO and first seasoned equity offering of the firm	SDC
Institutional holding	Percentage of shares held by institutional investors, excluding VC firms (see the SEC website for exact definition used here, following 13f filings: https://www.sec.gov/divisions/investment/13ffaq.htm)	Thomson Reuters Institutional (13f) Holdings
Active institutional holding	Percentage of shares held by active institutional investors. Definition of active institutional investors based on Almazan, Hartzell, and Starks (2005)	Hand collected data from SEC Edgar Database
Passive institutional holding	Percentage of shares held by passive institutional investors. Definition of passive institutional investors based on Almazan, Hartzell, and Starks (2005)	Hand collected data from SEC Edgar Database
Hot issue	Average initial returns of IPOs issued during the three months prior to the month of the IPO (similar to a measure used by Demers and Joos 2007).	SDC

Appendix Table 2: Descriptive statistics for the full sample and the subsamples according to VC backing (Panel Data)

This table provides the mean and median for all variables for the full sample of panel data and the mean for the subsamples of VC-backed and non-VC-backed IPOs at the time of listing. The t-test value is based on the mean difference between the two subsamples of IPO firms. All the variables are as defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	Full sample of IPO firms			VC-backed firms		Non-VC-backed firms		
Variables	N	Mean	Median	N	Mean	N	Mean	T-test
VC holding	8,294	0.042	0.000	4,111	0.086	4,183	0.000	-34.744***
VC number	8,301	0.662	0.000	4,111	1.337	4,190	0.000	-53.821***
Firm Size	8,403	5.790	5.765	4,230	5.107	4,173	6.483	40.924***
Leverage	8,363	0.441	0.350	4,195	0.331	4,168	0.580	12.701***
Market-to-book ratio	8,308	3.591	2.623	4,189	4.211	4,119	2.961	-16.622***
Ln(Firm age)	8,423	2.809	2.773	4,233	2.487	4,190	3.137	44.469***
R&D/TA	8,423	0.162	0.037	4,233	0.231	4,190	0.092	-4.626***
Operating income	8,350	0.052	0.087	4,204	-0.019	4,146	0.113	3.225***
Dividend premium	8,423	-5.272	-6.188	4,233	-5.154	4,190	-5.391	-1.778*
Turnover	8,423	3.842	2.786	4,233	4.338	4,190	3.341	-10.028***
NYSE listing	8,423	0.270	0.000	4,233	0.116	4,190	0.426	34.122***
Crisis dummy	8,423	0.111	0.000	4,233	0.118	4,190	0.104	-2.125**
Underwriter reputation	8,423	7.485	8.334	4,233	7.323	4,190	7.649	6.737***
Time to DI (years)	8,423	6.422	4.638	4,233	7.511	4,190	5.321	-16.098***
Time to first M&A (years)	8,423	9.525	10.701	4,233	8.950	4,190	10.105	9.251***
Time to first bond issuance (years)	8,423	7.722	7.539	4,233	7.935	4,190	7.459	-6.177***
Time to first seasoned equity issuance (years)	8,423	6.026	2.907	4,233	6.883	4,190	5.159	-12.711***

Appendix Table 3: Top 10 venture capital firms by number of IPOs backed

VC firm name	Number of IPOs backed
Artis Ventures Management	81
New Enterprise Associates	49
Great Oaks Capital Management	43
Sofinnova Investments	42
Foresite Capital Management	36
Domain Associates	31
Alta Partners	28
Sequoia Capital Partners	25
Technology Crossover Ventures	25
HLM Venture Partners	24

Appendix Table 4: Descriptive statistics of the matched sample using the entropy balancing method

This table provides the mean for all variables and for the treatment (VC-backed) and control (non-VC-backed) group post-entropy balancing. All the variables are as defined in Appendix Table 1.

	Treatment: VC-backed firms		Control: Non-VC-backed firms	
Variables	N	Mean	N	Mean
Firm Size	4,230	5.107	4,173	5.321
Leverage	4,195	0.331	4,168	0.351
Market-to-book ratio	4,189	4.211	4,119	4.271
Ln(Firm age)	4,233	2.487	4,190	2.384
R&D/TA	4,233	0.231	4,190	0.235
Operating income	4,204	-0.019	4,146	-0.018
Dividend premium	4,233	-5.154	4,190	-5.159
Turnover	4,233	4.338	4,190	4.481
NYSE listing	4,233	0.116	4,190	0.102
Crisis dummy	4,233	0.118	4,190	0.115
Underwriter reputation	4,233	7.323	4,190	7.331

Appendix Table 5: Additional robustness checks for other corporate events

Panel A presents robustness checks similar to those in Table 7 but for *Time to first M&A*, Panel B for *Time to first bond issuance*, and Panel C for *Time to first seasoned equity issuance*. Interacted industry-year fixed effects are included in all the specifications below.

PANEL A: Time to first M&A	Subsample up to 2015	Subsample of VC-backed only	VC-backed indicator	Subsample of VC-backed only (sample selection effect)
Variables	Model 1	Model 2	Model 3	Model 4
VC holding	0.146***	0.182***		0.182***
VC dummy			0.113***	
Firm size	0.086**	0.110**	0.093*	0.109**
Leverage	0.004	0.006	0.007	0.008
Market-to-book ratio	0.022	0.016	0.017	0.016
Ln(Firm age)	-0.018*	-0.036*	-0.015*	-0.036*
R&D/TA	-0.054**	-0.061**	-0.018	-0.061**
Operating income	0.001	0.004	0.009	0.004
Dividend premium	0.002	0.001	0.002	0.001
Turnover	0.013	0.040*	0.014	0.040*
NYSE listing	-0.042*	-0.026	-0.031	-0.026
Institutional holding	0.038*	0.065*	0.043*	0.065*
Underwriter reputation	0.008	0.009	0.008	0.009
Mills ratio				0.011
Interacted industry-year dummies included	Yes	Yes	Yes	Yes
Number of observations	7,900	4,230	8,007	4,230
Log likelihood	-26133.8	-13767.9	-26215.8	-13766.9
Chi-squared	988.4	702.7	1007.8	701.7

Appendix Table 5 continues

PANEL B: Time to first bond issuance	Subsample up to 2015	Subsample of VC-backed only	VC-backed indicator	Subsample of VC-backed only (sample selection effect)
Variables	Model 1	Model 2	Model 3	Model 4
VC holding	0.203***	0.222***		0.222***
VC dummy			0.125***	
Firm size	0.061*	0.052*	0.067*	0.053*
Leverage	0.014*	0.015*	0.010	0.016*
Market-to-book ratio	0.016	0.014	0.015	0.015
Ln(Firm age)	-0.043**	-0.071**	-0.039*	-0.071**
R&D/TA	-0.016	-0.013	-0.017	-0.013
Operating income	0.031*	0.014	0.002	0.014
Dividend premium	0.003	0.009	0.006	0.009
Turnover	0.015*	0.019*	0.014	0.019*
NYSE listing	0.090**	0.080**	0.020	0.080**
Institutional holding	0.027*	0.021*	0.024*	0.021*
Underwriter reputation	0.005	0.006	0.002	0.006
Mills ratio				0.010
Interacted industry-year dummies included	Yes	Yes	Yes	Yes
Number of observations	7,900	4,230	8,007	4,230
Log likelihood	-41524.0	-17839.6	-42305.0	-17838.6
Chi-squared	2271.4	850.6	2205.0	850.6

Appendix Table 5 continues

Panel C: Time to first seasoned equity issuance	Subsample up to 2015	Subsample of VC-backed only	VC-backed indicator	Subsample of VC-backed only (sample selection effect)
Variables	Model 1	Model 2	Model 3	Model 4
VC holding	0.041	0.068*		0.068*
VC dummy			0.031	
Firm size	0.052*	0.041*	0.051*	0.042*
Leverage	0.021*	0.007	0.029*	0.009
Market-to-book ratio	0.016	0.012	0.022	0.016
Ln(Firm age)	-0.015*	-0.019*	-0.018*	-0.019*
R&D/TA	-0.030*	-0.033*	-0.013	-0.033*
Operating income	0.018	0.016	0.008	0.016
Dividend premium	0.000	0.002	0.000	0.002
Turnover	0.033*	0.052*	0.027	0.052*
NYSE listing	-0.019*	-0.029*	-0.012	-0.029*
Institutional holding	0.075*	0.077*	0.058*	0.077*
Underwriter reputation	0.025*	0.027*	0.002	0.027*
Mills ratio				0.013
Interacted industry-year dummies included	Yes	Yes	Yes	Yes
Number of observations	7,900	4,230	8,007	4,230
Log likelihood	-47944.4	-22723.3	-48475.7	-22724.3
Chi-squared	2421.5	1739.1	2490.6	1738.1

Appendix Table 6: Determinants of the time to dividend initiation (robustness)

This table shows the estimation results of the Probit and Cox Proportional Hazard models. The dependent variable in Models 1 and 2 (Probit models) is a dummy equal to 1 if the IPO firm initiated dividend, and 0 otherwise. The dependent variable in Models 3 and 4 (Cox models) is the inverse of *Time to dividend initiation* (i.e., the hazard rate). Interacted industry-year fixed effects are included in all the specifications below. All variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	Probit model		Cox model	
Variables	Model 1	Model 2	Model 3	Model 4
VC holding	-0.163***		-0.325**	
VC number		-0.084***		-0.075**
Firm size	0.183***	0.192***	-0.092***	-0.091***
Leverage	-0.071**	-0.063**	-0.142**	-0.146**
Market-to-book ratio	0.006	0.005	-0.072*	-0.071*
Ln(Firm age)	0.002	0.002	0.273***	0.276***
R&D/TA	-0.032*	-0.028	0.023	0.025
Operating income	-0.011	-0.015	-0.113	-0.126
Dividend premium	0.001	0.001	0.003	0.003
Turnover	-0.087***	-0.085***	-0.064*	-0.057*
NYSE listing	0.018	0.016	0.098	0.101
Institutional holding	0.082***	0.083***	-0.060***	-0.061***
Underwriter reputation	-0.003	-0.001	-0.029**	-0.028**
Interacted industry-year dummies included	Yes	Yes	Yes	Yes
Number of observations	8,007	8,007	8,007	8,007
Log likelihood	-4914.5	-4946.6	-10453.1	-10288.2
Chi-squared	1244.9	1278.5	1321.3	1295.9

Appendix Table 7: Instrumental variable Tobit model to control for endogeneity

This table shows the first stage estimations of the IV Tobit models to control for possible endogeneity related to the VC holding. The dependent variable in all models is VC holding. *Hot issue* (our instrument) is measured as the average initial returns of IPOs issued during the three months prior to the month of the IPO. Interacted industry-year fixed effects are included in all the specifications below. All variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	Stage I: IV Tobit model			
	Dep=VC holding DI	Dep=VC holding First M&A	Dep=VC holding First bond issuance	Dep=VC holding First seasoned equity issuance
Variables	Model 1	Model 2	Model 3	Model 4
Hot issue	-0.133***	-0.111***	-0.112***	-0.107***
VC number	0.199***	0.176***	0.205***	0.172***
Firm size	-0.088***	-0.104***	-0.106***	-0.110**
Leverage	-0.149**	-0.131**	-0.145**	-0.112**
Market-to-book ratio	0.099***	0.069**	0.057**	0.048**
Ln(Firm age)	-0.141***	-0.139***	-0.116**	-0.153***
R&D/TA	0.005	0.006	0.004	0.010
Operating income	-0.031*	0.024*	-0.029*	-0.037*
Dividend premium	0.006	0.005	0.003	0.005
Turnover	-0.056**	-0.066***	-0.071**	-0.056**
NYSE listing	0.004	0.005	0.003	0.003
Institutional holding	-0.114***	-0.103***	-0.095***	-0.118***
Underwriter reputation	0.013*	0.015*	0.010*	0.017*
Interacted industry-year dummies included	Yes	Yes	Yes	Yes
Number of observations	8,007	8,007	8,007	8,007
Log likelihood	-1698.3	-1248.0	-958.6	-1471.2
Chi-squared	518.1	323.7	621.7	23.0

Appendix Table 8: Stock market reactions to event announcements

This table shows the estimation results of the cross-sectional analysis of announcement returns at the time of first dividend initiation (DI), time of first M&A, time of first bond issuance, and time of first seasoned equity issuance. The dependent variable is the CAR measured over a (-2,+2) window. All other variables are defined in Appendix Table 1. ***, **, * indicate 1%, 5%, and 10% significance levels.

	Time of first DI		Time of first M&A		Time of first bond issuance		Time of first seasoned equity issuance	
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
VC holding	0.028***		0.017***		0.052***		-0.002	
VC number		0.014*		0.013***		0.011***		-0.003
Firm size	0.006	0.007	0.021	0.016	0.049*	0.069**	0.031	0.016
Leverage	-0.006*	-0.010*	-0.063**	-0.067***	-0.018*	-0.027**	-0.065**	-0.081**
Market-to-book ratio	-0.016*	-0.019*	-0.007	-0.008	-0.003	-0.002	-0.016**	-0.017***
Ln(Firm age)	0.001	0.001	0.008	0.012***	0.001	0.001	0.002	0.002
R&D/TA	0.102**	0.129**	0.153***	0.105***	0.034***	0.042***	0.003*	0.012*
Underwriter Reputation	0.002*	0.001*	0.006*	0.005*	0.001	0.005*	0.001	0.001
NYSE listing	0.002	0.005	0.022	0.039***	0.0124	0.005	0.005	0.006
Crisis dummy	-0.013*	-0.001*	-0.024*	-0.035**	-0.009	-0.013**	-0.012*	-0.019*
Industry dummies included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	548	548	223	223	375	375	567	567
R-square	0.177	0.142	0.181	0.145	0.194	0.142	0.141	0.128