Long-Run IPO Performance and the Role of Venture Capital

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Abstract

Prior literature (e.g., Brav and Gompers, 1997) establishes that the average VC-backed IPO does not outperform benchmarks. In this paper, we show, by accounting for VC holdings, that the average VC-backed IPOs does outperform as long as the VC is still present. This outperformance continues following the lead VC's exit among portfolios that intersect each of these three conditions: (1) high-reputation VCs, (2) large VC syndicates, and (3) long pre-IPO holding periods. The data further indicate a significant role of capital and R&D expenditures for long-run VC-backed IPO performance.

Keywords: Venture Capital; Syndication; Reputation; Post-IPO Returns

JEL Classification: G24; G31

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1. Introduction

IPOs only offer a partial exit to VCs. VCs typically remain invested for three years following the IPO. Post-IPO VC involvement offers incentives to either focus on value creation or act opportunistically to facilitate an exit. This paper aims to examine whether VCs continue to create value after taking the portfolio company public. Prior research has tried to answer this question by studying the return patterns of VC-backed IPO companies over a 36- to 60-month period following the IPO (Brav and Gompers, 1997; Brau et al. 2004; Michel, 2014; Ritter, 2015; Barry and Mihov, 2015; Buchner et al., 2019). The consensus is that VC-backed companies outperform "regular" IPO companies but on par with benchmarks. However, due to the large heterogeneity in VC exit times [17 months (25^{th} percentile) and 45 months (75^{th} percentile)], using a fixed time horizon does not capture potential performance differences between portfolio companies where VCs are present or have exited. Consequently, our knowledge is limited regarding the value creation impact VCs have after the IPO.

To address this gap, we explore numerous dimensions of monitoring and sources of long-term value creation when VCs are present, and after VCs exit post-IPO. First, we study the role of VC reputation to capture the quality of monitoring (Nahata, 2008; Krishnan et al., 2011). Second, we study the role of syndicate size. Larger syndicates can create both short-term and long-term value; syndicates allow VCs to share their specific knowledge and complementary skills, and, thereby, add more value to the PC (Bygrave, 1987; Brander et al., 2002; Bayar et al., 2020). Furthermore, syndication can improve the selection process through improved screening, due diligence, and decision making (Lerner, 1994; Brander et al., 2002; Bubna, Das and Prabhala, 2020). Syndication also leads to an increased likelihood of an IPO exit and higher IPO valuations (Tian, 2012). Third, we further explore the role of a holding period before the IPO. We argue that the longer the holding period, the greater the influence of the VC. And further, we examine the role of financial details such as R&D and capital expenditures of portfolios of companies among high and low-reputation VCs pre- and post-VC exit.

When VCs take a company public, they refrain from selling all shares at the IPO. Due to the high levels of information asymmetry at the IPO, selling a large fraction of the holdings sends a negative signal concerning the company's valuation (Myers and Maljuf, 1984). Iliev and Lowry (2020) even

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report that 15% of the VCs increase their holdings post-IPO. Consequently, VCs have substantial holdings after the IPO which offers multiple exit strategies. We identify four alternative exit strategies. First, simultaneously as VCs search for exit routes they continue to create long-term value in the PC through costly monitoring to maximize their return on investment. Second, as VCs often sell a fraction of their shares at the IPO, it reduces the incentives to engage in costly monitoring and instead shifts their focus towards divesting their remaining holdings and divert their attention to their other PCs. Third, as put forward by Jenkinson et al. (2020), VCs potentially retain their investments longer than optimal to capture management fees at the expense of their limited partners (LPs). Fourth, the limited fund life incentivizes the VCs to act myopically by substituting long-term value creation for increased short-term earnings (Harford and Kolasinki, 2014). Among the exit strategies, the first represents the optimal outcome for VCs, LPs, and PCs, while the latter three infer increased utility of the VCs at the expense of the other parties.

To examine the pre- and post-exit value creation in VC-backed companies, we hand-collect lead VC ownership and exit times for 448 U.S. VC-backed companies that went public during the time-period 2004-2014 and track their exiting behavior in the subsequent years to 2018. Following Brav and Gompers (1997), we initially use a Fama-French three-factor model with a 60-month tracking period and similarly do not find that VC-backed IPOs outperform benchmarks. However, when we create portfolios distinguishing between VC presence and absence, we find an average monthly alpha of 0.88pp when the lead VC is present. Following the exit, the outperformance diminishes. This performance differential reveals the need to accommodate the exit time to fully capture the lead VCs' role in post-IPO value creation and suggests that prior studies potentially underestimate the alphas of VC-backed IPOs. In the next set of tests, we relax the limitation of using a fixed holding period and include a PC in the VC's present portfolio until the lead VC exits. Our three-factor model shows a similar outperformance but with a higher monthly alpha of 1.11pp when the lead VC is present. Since VC-backed companies invest heavily at low levels of profitability, we further include two additional risk factors– profitability and investments. Our augmented model shows an average monthly alpha of 1.79pp while the VCs are present. Following the VCs exit, some outperformance persists but the

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monthly alphas reduce to 0.65pp. We also consider valuation effects and find that VC backed IPOs exhibit higher pre-exit valuations. Since VC exits are not exogenously determined, we endogenize VC presence in instrumental variable regressions and examine the effect on Tobin's Q. Our results show that PC valuations are higher when the lead VC is present.

Prior studies identify monitoring, selection, and myopia as possible reasons for positive post-IPO alphas. Monitoring represents value creation supported by VC involvement. VCs provide services related to human resources, marketing, and management (Gorman and Sahlman, 1989; Sahlman, 1990; Hellmann and Puri, 2002) and further assist in increasing innovation (Bernstein, Giroud, and Townsend, 2016), improving production efficiency (Chemmanur, Krishnan, and Nandy, 2011), reducing time to bring products to the market (Hellmann and Puri, 2000), and increasing asset productivity (Nahata, 2008). Selection stems from VCs' superior ability to scout high quality companies (Tyebjee and Bruno, 1984; Macmillan, Zemann, and Subbanarasimha, 1987). Their selection process is aided by their experience and ability to reduce information asymmetry (Amit, Brander, and Zott, 1998). Value creation via monitoring and selection are not mutually exclusive, Sörenson (2007) and Nahata (2008) find that successful exits are the result of both VC's effective monitoring and their diligent selection. Finally, the finite holding period potentially incentivize VCs to influence PC management to act myopically.

A high degree of VC monitoring should be linked to PCs outperforming benchmarks during their presence but following their exit; stock market performance reduces to mimic benchmarks. Monitoring to improve processes and investment into long-term value creation instead leads to continuous outperformance following the VCs' departure. On the contrary, myopic behavior leads to short-term outperformance prior to the exit followed by a sharp decline in returns. Our return patterns are in line with VCs continuing to add value after the IPO through monitoring. The data presented herein indicate that reputation, syndicate size, and the pre-IPO holding period all interact to have a positive impact on long-term value creation manifested in positive post-exit alphas which can be the result of greater long-term value creation and selection. The data also show higher alphas among portfolios of firms with high R&D and low capital expenditures. Portfolios of high-reputation, VC-

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backed companies do not exhibit positive alphas after VCs exit unless both syndicate size and pre-IPO holding periods are above median levels. Portfolios of low-reputation, VC-backed companies do not exhibit positive alphas after VCs exit, regardless of syndicate size, pre-IPO holding periods, and capital and R&D expenditures.

We conduct several robustness tests. First, we ensure that our findings are not driven by factor contamination (Loughran and Ritter, 2000) by using factors purged from VC-backed IPO companies. Second, we re-estimate our main models using value-weighted portfolios. Even though value-weighted portfolios are inferior to equally-weighted portfolios in detecting abnormal performance (Brav, 2000; Loughran and Ritter, 2000), our findings remain intact by using value-weighted portfolios. Third, we acknowledge that the portfolio size differs over our sample period, due to the test design and clustering in IPO and exit activity. Therefore, we pose additional restrictions on our portfolio formation by only including months where the portfolios consist of at least 10 assets. Our findings remain intact after the additional restrictions on portfolio formation.

Our study adds to the literature on the stock market performance of VC backed IPOs (Barry et al., 1990; Brav and Gompers, 1997; Brau et al., 2004; Campbell and Frye, 2006; Krishnan et al., 2011; Michel, 2014; Ritter, 2015; Buchner et al., 2019; Burt et al., 2022). Closest to our study, Krishnan et al. (2011) examine whether IPOs where the lead VC is present at 36 months following the listing exhibit greater performance during this time-period relative to IPOs where the lead VC exited at an earlier stage. We instead introduce a lagged monthly measure of VC involvement, free from potential look-ahead bias. Our measure also enables us to study the VC induced performance on monthly frequency for the 62% of cases where the lead VC exits before 36 months following the IPO, and to capture the return for 40.1% of the post-IPO holding period among firms where the VC exits after 36 months following the IPO. Except for Krishnan et al. (2011), prior work ignores post-IPO VC involvement when studying return patterns of VC backed IPOs. In general, by accounting for exit times, we show that VC presence is linked to both higher valuations and returns. Our findings suggest that parts of the VCs' value creation are priced in at the IPO, but not completely, which is manifested through positive Fama-French 5-factor alphas.

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Second, our study adds to the understanding on how VC involvement impacts long-term performance. More specifically, our study complements prior work on the impact of VC reputation (Nahata, 2008; Krishnan et al., 2011), syndicates (Bygrave, 1987; Brander et al., 2002; Tian, 2012; Bayar et al., 2020) and VC holding period (Cumming and Johan, 2010; Basnet et al., 2022) on portfolio company performance. We show that reputation, syndicate size and VC holding period are not only linked to superior performance while the lead VC is present but also following the lead-VC's departure. In sum, we add to the understanding on how VC involvement creates value following the IPO and after their exit.

Our paper is structured as follows. In Section 2, we explain our data sources, define our variables, and explain our univariate findings. In Section 3, we analyze PC's return in the presence/absence of the lead VC. Finally, we conclude our analysis in Section 4.

2. Data

We begin our data collection by retrieving data from Thomson Reuters SDC Global Issues database for all US companies going public between 2004 and 2014. Our sample ends in 2014 to allow for sufficient time for the lead VCs to exit the portfolio companies (we track the companies 60-months following the IPO or until the end of 2018). We exclude IPOs that: a) have an offer price of less than $5, b) raise IPO proceeds less than $5 million, c) are unit offerings, and d) operate in the financial sector (SIC codes: 6000-6999). Following our initial restrictions, the sample size is reduced to 549 VC-backed and 526 non-VC-backed IPO companies. We hand-collect post-IPO VC ownership and lead VC exit time data from publicly available SEC filings. We remove 101 companies from our sample, since we cannot track the divestment process of lead VCs, because either lead VCs are active at the end of year 2018.[1] We supplement this dataset with accounting data from COMPUSTAT; stock returns from CRSP; and IPO, VC, and company characteristics from SDC Global Issues and VentureXpert. Our final sample includes 448 VC-backed IPOs.

[1] We stop collecting data for lead VCs after December 31, 2018.

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We define *lead VC* according to the following sequential criteria: 1) a lead VC must have the highest amount invested as per the SDC variable 'Firms total known amount invested'; 2) if two or more VCs have an equal amount invested, then the lead VC must have the highest ownership at the IPO (before the offering); and 3) if two or more VCs have an equal amount invested and equal ownership at the IPO, the lead VC must hold more number-of-directorship positions. Following the screening, we only have one lead VC per PC. Differing from Hochberg, Ljungqvist, and Lu (2007), who define lead VC as the VC with the highest amount invested in a PC, and Lin and Smith (1998), who focus on equity position and board representation, we go one step further and require lead VCs to hold ownership stakes at the IPO stage.

After determining the lead VC, we hand-collect post-IPO ownership data from IPO prospectuses (S-1, 424B1, 424B2, 424B4), proxy materials (DEF 14, DEFM14), beneficial ownership reports (SC 13G/D), insider transactions (Form 4), and annual or quarterly reports (10-K, 10-Q) available in the SEC EDGAR database. To ensure that we do not lose ownership information available to the public, we web scrape all SEC filings that mention the name of "lead VC" or "lead VC funds" or "managers of the lead VC funds" and manually read the filings to collect ownership data[2]. Using the ownership data, we create an indicator variable, VC present, that takes the value of one, if the lead VC is present in the PC, and zero otherwise.

Table 1 shows the distribution of VC-backed IPOs over time and the timespan between IPO and VC exit over the sample period (2004-2014). The sample includes a total of 1,075 IPOs, out of which 549 are VC-backed and 526 are non-VC-backed. After removing 101 companies in which we are unable to determine the exit date of lead VCs, we are left with 448 VC-backed companies that are included in our analysis. In these companies, lead VCs exit 2.90 (median = 2.5) years after the IPO date. The average exit time varies from 1.83 years in 2008 to 3.49 years in 2007.

< Table 1 about here>

[2] By reading the comments in the filings, we ensure that the shares belong to the lead VC and not to their managers.

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To study the valuation effects of lead VC presence, we use Tobin's Q, defined as the ratio of market value of assets to book value of assets. We include standard accounting controls: size, leverage, ROE, and cash. Size is the natural logarithm of market capitalization. Leverage is defined as long-term plus short-term debt scaled by total assets. ROE is the ratio of net income to total equity. We measure the companies' cash holdings as cash scaled by total assets. Since all our accounting controls enter the models with one lag, we use the market capitalization at the end of the first trading day for the IPO year, and the same applies to market-to-book. To control for the effect of the outliers, we winsorize the accounting variables at 1 and 99 percentiles.

In further analysis, we study how reputation, syndicate size, and pre-IPO holding period affect long-term value creation. Following Nahata (2008), Krishnan et al., (2011) and Tian et al., (2016), we calculate VC reputation at the IPO date as the ratio of all IPO involvements by lead VC during the last five years scaled by the number of all VC-backed IPOs during the same period. We define syndicate size as the number of VCs invested before the IPO. We define pre-IPO holding period as the difference in years between lead VC's first investment date in the PC and the PC's IPO date. All variables are defined in detail in Appendix 1.

Panel A of Table 2 shows that post-IPO VC-backed companies have higher Tobin's Q, R&D expenditure and hold more cash but have lower leverage and ROE. These differences show some aspects of VC selection. Despite selecting high-quality companies, VCs also create value in their PCs by providing monitoring. Panel B shows that VC- and non-VC-backed IPOs are fundamentally different. Compared to non-VC-backed IPOs, VC-backed IPOs have lower offer size, offer price per share and age at the IPO, but they have higher underpricing. Lee and Wahal (2004) and Gill and Walz (2016) also report similar differences between the two samples. Panel C shows that lead VCs rarely sell all their shares at the IPO and hold, on average, 15.4% of the PCs' outstanding shares.

<Table 2 about here>

2.1. Return data

To examine the VCs value creation in the PC, we split the sample into groups depending on if the lead VC is still present or has exited the PC. The VC presence sample tracks the companies from

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the IPO until the exit of the lead VC. After the lead VC exits, we track the companies for 60 months, although the average listing time after the VC exit is 44 months. In accordance with Brav and Gompers (1997) and Ritter (2015), we use monthly return data starting at the end of the first trading month. For descriptive purposes, we partition our sample into three groups: Full Sample; Excluding M&A Exits; and >12 Months of Post-IPO Holding Period. We study the differences with and without M&A exits, because we cannot track the PC following the completion of the M&A transaction. Masulis and Nahata (2011) report that M&A exits of VC-backed companies lead to higher acquirer announcement returns, suggesting that such M&A transactions are coupled with conflicts of interests. Hence, this is not likely to bias our results in any direction. Next, we also exclude short exits, since prior work establishes that exit time is endogenous to the returns (see e.g., Basnet et al., 2022; Jenkinson et al., 2021); i.e., higher return realizations lead to faster exits. Hence, a higher return realization triggers a VC to exit faster creating longer holding periods with lower-than-average returns. Therefore, in our study we do not consider buy and hold returns (BHAR). BHAR as a trading strategy involves buying an equally-weighted portfolio of all VC-backed IPOs and holding them until the VC exits, making the BHAR returns non-comparable, due to the large discrepancies in holding periods.

<Table 3 about here>

The first row of Panel A of Table 3 shows the average monthly returns for VC-backed IPOs before and after the VC's exit. The average pre-exit and post-exit monthly returns are 1.55pp. Next, we consider returns in excess of the risk-free rate and find that the average monthly excess return for VC-present PCs is 1.46 and VC-exit PCs is 1.48. The univariate comparisons do not show any differences between pre- and post-exit returns. Next, we consider pre- and post-exit excess return differences, using the value-weighted CRSP index and an equally-weighted, non-VC-backed IPO portfolio (holding period 60-months) as benchmarks. The VC-backed companies exhibit returns in excess of both benchmarks pre- and post-exit. Again, we do not report any significant pre- and post-differences in average excess returns between the pre- and post-VC exit groups.

In Panel B of Table 3, we consider the PC returns sensitivity to various risk factors by estimating PC-specific factor model alphas. We estimate one-factor (Market factor), three-factor

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(Market, HML, and SMB factors), and five-factor (Market, HML, SMB, RMW, CMA factors) models. All alphas are positive when VC is present. The highest statistical significance for the pre-exit alphas is observed in the three-factor model for the full sample and five-factor model, after excluding short exits. In a comparison between pre- and post-exit alphas, we find a significant outperformance during VC presence compared to the post-exit alphas in both three- and five-factor models.

In sum, our results show that VC-backed companies at least perform on par with benchmarks. The return differences between VC present and VC exit are only significant in factor models. Our findings reveal that after taking into account various risk factors, VC-backed IPO companies outperform the market while the lead VC is present. Furthermore, we observe that the LPs benefit from VC involvement relative to investments in the market or an IPO portfolio. This contradicts Jenkinson et al. (2021) who argue that private equity funds (PEs) through longer holding periods extract higher management fees at the expense of the LPs.

3. Empirical analysis

Our empirical analysis starts with replicating the setting of Brav and Gompers (1997), by estimating calendar-time Fama-French three-factor models with a 60-month post-IPO tracking period including all VC-backed companies. For example, if the lead VC exits after X months (where X<60 months), the Brav and Gompers (1997) portfolio construction captures the lead VC's presence of X months and also the (60-X) months following the lead VC's departure. Our portfolio construction disentangles the X months of VC presence and the (60-X) months after the lead VC's exit. Hence, if the value creation is higher during VC presence, Brav and Gompers (1997) underestimate the value creation conducted by the lead VC. Therefore, we create a portfolio only including PCs where the VC is still present over the 60-month window. Lastly, we create a portfolio including PCs where the VCs have exited over the same time-horizon (including 60-X months in our example).

In our analysis, we regress the rolling portfolios of VC-backed IPO stocks on the three factors in model (1):

$$(R_t - Rf_t) = \alpha + \beta_1(R_{mt} - Rf_t) + \beta_2 SMB_t + \beta_3 HML_t \qquad (1).$$

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All portfolios are formed each calendar month by equally-weighting the returns in excess of the risk-free rate. We end up with 191 monthly portfolios including all VC-backed IPOs, compared to 178 monthly portfolios formed on pre-exit and 180 formed on post-exit excess returns. The large discrepancies in VC exit time as seen in Table 1 motivate the use of calendar time regressions. Compared to BHAR that builds on equally-weighting all companies at the IPO, calendar time portfolios are rebalanced monthly. Monthly rebalancing is less biased towards short exit times and thereby less likely to over-weight the high returns of PCs in which VCs exit close to the IPO. Our main specifications use equally-weighting of the calendar-time returns; indeed, both Brav (2000) and Loughran and Ritter (2000) argue that equally-weighted portfolios better detect abnormal performance relative to value-weighted portfolios. Furthermore, Loughran and Ritter (2000) point out that factor contamination can potentially bias three-factor alphas towards zero. The small and low B/M portfolios are likely to include recent IPO companies; SMB will covary positively, while HML will covary negatively with IPO returns. To resolve this issue, we create factors purged from IPO companies.

<Table 4 about here>

Columns (1) to (3) in Table 4 show the benchmark models used in Brav and Gompers (1997). In line with their findings, we do not report any outperformance of VC-backed IPOs. In Columns (4) to (6) we create portfolios with up to a 60-month post-IPO holding period only including PCs where the VC is present (up to the exit month). In contrast to prior models, alphas are positive and statistically significant in all three models. The highest alpha is found in the one-factor model (alpha= 0.91). In Columns (7) to (9) we instead create a portfolio including companies where the lead VCs have exited, showing a performance on par with benchmarks.

In sum, our results show that VC presence is linked to better stock market performance. The fixed time-horizon used in Brav and Gompers (1997), does not fully capture the VC's role in post-IPO value creation, suggesting that prior studies potentially underestimate the role of VCs in post-IPO value creation.

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3.1. Pre- and post-exit returns

The initial part of the analysis explores the returns among VC-backed IPO companies before and after their exit within a risk factor framework. Instead of using a fixed-time horizon, we first track the PC until the lead VC's complete exit. Second, we follow the PC up to 60 months following the lead VC's exits. We estimate three different factors models; a single-factor model including the market factor; a Fama-French (1993) three-factor model including market ($R_{mt} - Rf_t$), size (SMB), and book-to-market (HML) factors; and a Fama-French (2015) five-factor model including market ($R_{mt} - Rf_t$), size (SMB), book-to-market (HML), profitability (RMW), and investment (CMA) factors. We form portfolios each calendar month by equally-weighting the returns in excess of the risk-free rate. We end up with 179 monthly portfolios formed on pre-exit and 180 formed on post-exit excess returns.

<Table 5 about here>

Table 5 shows the VC-present and the VC-exit calendar time portfolios regressed on the risk factors. We observe that PCs outperform benchmarks when the VC is present in all three models. In Columns (2) and (3) VC-present returns load positively against SMB and negatively against HML, suggesting that VC-backed companies are, in general, small companies with low B/M ratios. The alphas are positive and statistically significant in both portfolios. Due to the high investment rates and low profitability of VC-backed IPOs, we observe significantly higher alphas in a five-factor framework, where the alpha for the VC-present portfolio increases from 1.11pp in a three-factor framework to 1.79 in a five-factor framework. A similar pattern can be observed for the VC-exit portfolio. We only observe a significant alpha in a five-factor framework following the VCs' departure. The negative slopes of the RMW and CMA factors imply that VC-backed companies continue to be unprofitable with high investment rates also after the VCs' exit. In Columns (7) to (9), we create long-short portfolios going long in the present portfolio and short in the exit portfolio. We show a positive alpha for all long-short portfolios, except in the three-factor model where the t-stat is just below 1.65 (t-value=1.63).

To ensure that our findings are not driven choice of standard errors or the 60-month post exit tracking period. We re-estimate our main findings using Newey and West (1987) standard errors with 12 lags. This is to ensure that seasonalities in listing and exit decisions are not driving the significance

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of our findings. The estimations using Newey-West standard errors in Table IA1 do not alter our interpretation. VC backed IPOs have significant alphas while being present in the portfolio company. Next, we limit our sample to only include returns up to 60 months. Hence, the analysis includes X VC present months and 60-X VC exit months. Our findings in Table AI2 show similar estimation outcomes as prior analysis, VC backed IPOs outperform the market while the lead VC is still present.

In sum, we observe higher alphas compared to prior work (e.g., Brav and Gompers, 1997; Barry and Mihov, 2015; Ritter, 2015). This is partly due to differentiating between VC-backed IPOs when the VC is present and following their exit. It is evident that the use of a five-factor model increases the alpha of VC-backed companies, due to their higher investment and lower profitability levels. In connection to our hypotheses, we find support for both monitoring and selection by the VCs. In a five-factor framework, the VC-backed companies outperform benchmarks both when the VC is present and following the VC's exit, which suggest that VCs select high quality companies. However, the slightly lower alphas following the departure of the VCs show that the value creation is greater when the VC is present.

3.2. Valuation effects

Prior tests establish that venture capital backed IPOs outperform benchmarks when the lead VC is present. Our findings imply that the stock market fails to fully incorporate all the value-added provided by venture capitalists. To analyze if the stock market partly price in VCs' value creation, we study valuation differences between years the VC is present and have exited the portfolio company. We conduct two set of tests to examine Tobin's Q differences before and after the lead VC's exit. In our first test, we estimate a fixed effects regression by including industry- and year- fixed-effects in addition to standard controls (size, leverage, ROE, cash holdings, reputation, distance, and investment portfolio share). Second, because a VC's decision to exit may be endogenously determined, we use a two-stage least-squares method. We use two different instruments. The first excluded instrument (*Deviation from VC Fund Average*) is measured as the VCs average holding period (excluding this investment) minus years since first investment. The second excluded instrument (*Deviation from Industry Average*) is calculated as number of years since the lead VC's first investment in the company relative to the

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industry's average exit time (Average exit time within industry- Years since the first investment). Both average exit time measures exclude the specific investment from the calculations. The rationale behind our instruments is the existence of industry and fund specific components in the total investment period (see e.g., Giot and Schweinbacher, 2007; Barrot, 2016), which is correlated with VC presence within funds and industries, are less likely to be correlated with the valuation of a specific investment. Since the excluded instruments capture time from first investment subtracted from a VC or industry average, we expect that our excluded instruments are positively related to VC presence. To satisfy the inclusion restriction, the results from our first stage regressions show strong positive links between our instruments and VC presence (F-stats=10.57; 27.91). We can only argue that our instruments satisfy the exclusion restriction, i.e., that deviation from average VC and industry exit time only affects the company's valuation through the VC being present. Since our excluded instruments are based on industry and fund level averages the link to investment level Tobin's Q is ambiguous. It is highly unlikely that a fund's average investment period should impact Tobin's Q of individual portfolio companies following their departure. Furthermore, our measure builds on the entire holding period of the investments and is not subject to seasonality and waves in the IPO market. We acknowledge that excluded instruments based on sub-groups (especially at the industry level) can be problematic [See, e.g., Larcker and Rusticus (2010) and Gormley and Matsa (2014)]. To partly mitigate this problem, instead of one, we use two instruments in separate regressions at the venture capital firm and portfolio company industry level.

<Table 6 about here>

As a base-case analysis, the non-instrumented results in Model (1) of Table 6 show that lead VC presence increases company valuation by 0.35 ($p<0.05$); this corresponds to an increase of 10.57% relative to the sample mean of VC-backed IPOs (3.31). The results remain statistically significant after instrumenting VC presence in Column (3) of Table 6, where we endogenize VC presence using the fund level measure as excluded instrument. By instrumenting VC presence, the coefficient increases substantially to 3.11. In Column (5) of Table 7, we instead use the industry-based instrument and report similar results. The much larger coefficient estimates of VC presence in column (3) and (5) is due to

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that VC presence enters the Tobin's Q regression as a continuous probability instead of a binary variable as in Column (1). The economic magnitude is similar, for the findings in column (3), a one standard deviation increase in the likelihood of the lead VC being present results in Tobin's Q increases by 19.05%. Endogenizing VC presence does not alter the conclusions, portfolio companies carry a higher valuation during years when the lead VC is present. Among the control variables, we contrary to Krishnan et al. (2011) find that reputation is negatively related to Tobin's Q. This can potentially depend on younger VCs taking portfolio companies public at an earlier stage, where they have more unrealized investment opportunities leading to higher Q ratios (Gompers, 1996). Auxiliary tests in Table A5 repeat the analysis in Table 6 using industry level fixed effects instead of VC firm level fixed effects. The findings do not alter our interpretation, VC presence has a statistically significant positive impact on portfolio companies' valuations.

One alternative explanation unrelated to VC value creation is that the VC market time their exits. It is likely that the VC is better informed about the prospects of the firm compared to outsiders, making it possible to capitalize on potential overvaluation. However, market timing stemming from overvaluation should lead to negative post-exit alphas. Our findings in Table 5 do not lend support to a market timing explanation, portfolio companies instead perform in line with benchmarks or even outperform benchmarks in a five-factor model following the exit of the lead VC.

3.3. The role of reputation, syndicates, and pre-IPO holding periods

In prior tests, we establish that lead VCs on average generate positive alphas when they are active in the PC. The alphas significantly drop in magnitude following the lead VC's departure. In this subsection, we explore three possible factors that affect long-run value creation post VC exit: reputation as a measure of monitoring quality (Nahata, 2008; Krishnan et al., 2011), syndication (Lerner, 1995; Tian, 2012; Bayar et al., 2020), and the length of the pre-IPO holding period (Megginson and Weiss, 1991).

To study the effect of reputation and syndicate size on PC returns, we split our sample at the median reputation and median syndicate size to form monthly VC-present and -exit calendar time portfolios. The VC-present portfolio tracks the PC until the lead VC exits, and the exit portfolio tracks

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the PC 60-months following the exit. We further conduct double sorting within the small and large syndicate groups based on lead VC reputation to form calendar time portfolios. We then conduct triple sortings within the short and long pre-IPO holding period. We regress our portfolios on the Fama-French (2015) five-factor model purged from IPO returns. We report our findings in Tables 7-9.

<Tables 7-9 about here>

Table 7 shows single sorts based on VC reputation in Columns (1) to (4) and syndicate size in (5) to (8). Our findings suggest that both low and highly reputable VCs create value while they are still invested in the PC. However, only highly reputable VCs are able to create long-term value. This is consistent with both better monitoring and superior selection explanation consistent with Sörensen (2007). In Columns (5) to (8) we observe similar patterns for syndicate size; PCs with larger syndicates involved have higher post-lead VC exit returns. Again, this is consistent with both greater long-term value creation as in Bayar et al. (2020) and improved deal selection (Lerner, 1994; Brander et al, 2002).

Table 8 shows double sorts on syndicate size and lead-VC reputation. Yet again our findings reveal that all portfolios exhibit positive and significant pre-exit alphas. However, the post-exit outperformance is concentrated among large syndicates with highly reputable lead VCs, suggesting that having a large syndicate or being highly reputable alone does not entail superior performance.

Table 9 Panel A shows long-run value creation after VC exit is only observed among the portfolio of high-reputation, large syndicate, and long pre-IPO holding periods. For this subsample, the alpha is 1.42 and significant at the 1% level. If any of these three conditions are not met, alphas are insignificantly different from zero. The data clearly show that VCs add long run value that persists after exit when the VCs are of high reputation among large syndicates that took significant time to monitor and add value to the company before taking it public.

Examining sorts of the data based on reputation and R&D (Table 10), and reputation and capital expenditure (Table 11), the data indicate that high-reputation VC portfolios after exit also generate positive and significant alphas as long as R&D expenditures are high (in Table 9 the alpha is 1.79 and

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significant at the 10% level) and capital expenditures are low (in Table 8 the alpha is 1.26 and significant at the 5% level).

<Tables 10-11 about here>

Prior to VC exit, the data in Table 9 Panel B show alphas are positive among some portfolios of companies backed by low-reputation VCs. The alpha is positive and significant among low-reputation VCs that are still present when syndicates are small and pre-IPO holding periods are short, which is not expected. Nevertheless, when examining Tables 10 and 11, we see that alphas are positive and significant when low-reputation VCs are present only if there are high R&D expenditures are low capital expenditures, which is expected. When high-reputation VCs are present, alphas are significantly positive, regardless of capital and R&D expenditures in Tables 10 and 11. While there is no difference in alphas in relation to capital expenditures when high-reputation VCs are present (Table 11), alphas are much higher at higher R&D levels when high-reputation VCs are present (Table 10). Table 10 indicates that when high-reputation VCs are present, the alpha is 1.16 and significant at the 5% level and for low levels of R&D expenditures and 2.67 and significant at the 1% level for high R&D expenditures.

Overall, the data indicate VC presence significantly positively affects alpha. Portfolios of present low-reputation, VC-backed companies show significant alphas when capital expenditures and low and R&D expenditures are high; after these VCs exit, alphas are insignificantly different from zero. The data further indicate superior alphas for portfolios of companies backed by high-reputation VCs even after the VCs exit, but only if syndicate size was large and pre-IPO investment duration was long. These portfolio companies also exhibit high R&D and low capital expenditures.

3.4. Robustness tests

We compare VC-backed IPO companies by using non-VC-backed IPOs as performance benchmarks. The analysis is motivated by the fact that we possibly capture an IPO or new issues effect in our previous analysis (See e.g., Carter et al., 2011 and Blomkvist et al., 2017), and thus the return patterns are not specific to VC-backed companies. To overcome this problem, we create long-short portfolios against non-VC-backed IPO companies. By introducing a counterfactual portfolio consisting

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of non-VC-backed IPO companies, we control for return variation specific to IPO companies. We construct equally- and value-weighted portfolios from non-venture backed IPO companies with a holding period of 60 months following the IPO.

Our first findings in the Appendix: Table A2 reveal that non-VC-backed IPO companies perform in line with established benchmarks. The alphas are slightly positive in the equally-weighted portfolio 0.06 (Column 1) and negative (-0.15) for the value-weighted portfolio in Column 2, albeit not statistically different from zero. When constructing long-short portfolios of the equally (value) weighted pre-exit VC portfolio and the equally (value) weighted IPO portfolios in Columns (3) and (4) we observe that VC-backed companies outperform IPO companies prior to the VC's exit. The long-short monthly alphas are economically significant at 1.62pp for the equally-weighted portfolio and 1.24pp for the value-weighted long-short portfolio. VC-backed companies slightly outperform IPO companies in an equally-weighted long-short portfolio after the VC exits [Column (5)], but not in a value-weighted long-short portfolio [Column (6)].

The main tests in Table 5 consider equally-weighted portfolios. However, to ensure that our findings are not only driven by small VCs we create value-weighted portfolios. The VC-present portfolio is based on the months the lead VC is present. The VC-exit portfolio accounts for all months up to 60-months following the lead VC's exit. We value weigh the portfolios in the beginning of every month based on market capitalization. Column (3) of Table A3 show that VC-backed companies outperform benchmarks when the VC is present in a five-factor framework. Our tests fail to reach statistical significance in one- and three-factor frameworks, highlighting the importance of taking into account the lower profitability and higher investment rates among VC-backed companies. When considering the PCs' performance following the exit in Columns (4) to (6), we do not report any under- or over-performance among previously VC-backed companies. The weaker outperformance in value-weighted portfolios is not surprising, as both Brav (2000) and Loughran and Ritter (2000) argue that equally-weighted portfolios better detect abnormal performance relative to value-weighted portfolios.

Next, due to our sample and test design, we have an uneven amount of assets in the portfolios at different periods of time (see Figure A1). Furthermore, as argued by Loughran and Ritter (2000) and

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Schultz (2003), IPO portfolios will have more assets following large issuance activity, and it is possible that returns are lower following periods of high issuance activity. In our case, market peaks should not have a large impact, since VCs are both more likely to take the PC through an IPO during hot issue markets and to exit. Hence, the effect on the two portfolios should be comparable. However, to ensure that our findings are not driven by a few assets in the beginning of the exit sample and the end of the time period for the pre-exit sample, we re-estimate the models, requiring at least 10 assets in the portfolios. In this setting, the analysis begins in January 2006 and ends in December 2017, which yields a minimum of 16 assets in the present and 13 in the exit portfolio. Our estimations presented in Table A4 reveal that our findings are not driven by few assets in the test portfolios. The findings remain similar, where we observe a slight outperformance for the equally-weighted portfolios relative to benchmarks, and that this outperformance is stronger when the VC is present.

In an unreported test, we analyze the impact of post-IPO VC reinvestment in the portfolio company, because both Iliev and Lowry (2021) and Basnet et al. (2022) report return differentials between VC reinvested and non-reinvestment portfolios. In our tests, we double sort reinvestment and the PC's R&D, CAPEX, and VC reputation. We do not see any discernible patterns in the data. This could potentially be due to the sample size; future research may shed more light on the issue.

4. Conclusion

Previous literature (Brav and Gompers, 1997; Krishnan et al., 2011) examines VC influence on the performance of VC-backed portfolio companies using a fixed horizon of 36- to 60- months following the IPO. Due to the large heterogeneity in VC exit times, using a fixed time horizon does not capture potential PC performance in presence of the lead VCs. To resolve this issue, we hand-collect VC ownership data for 448 US VC-backed IPO companies from several SEC filings to identify the lead VC's complete exit from the PC. We then track the PCs up to 60 months after the lead VC's complete exit.

By not considering the exact exit time of the lead VCs, prior work potentially downward biases the influence of VCs on the value creation in the PCs. We report an average monthly alpha of 0.80 to 0.91 pp when the lead VC is present. Furthermore, we highlight the importance of considering the

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investment and profitability factor when analyzing VC-backed returns. We show a significant PC outperformance when the lead VC is present in a five-factor framework. This outperformance stems from VC monitoring as we report that PCs with more reputable VCs and with larger VC syndicate exhibit higher return. After VCs exit, long-run alphas remain positive and significant when three conditions are simultaneously met: VCs are reputable, VC syndicates are large, and pre-IPO holding periods are long. These conditions are consistent with prior work on the importance of VC reputation (Nahata, 2008), syndicate size (Lerner, 2005; Tian, 2012), and the duration of VC monitoring and advice (Megginson and Weiss, 1991). The data we examined show that the successful portfolios after reputable VCs exit also tend to have higher R&D expenditures.

Our analyses of VC-backed IPO portfolios are based on proxies for VC value added, and with U.S.-only data. Future work could develop additional proxies for the quality and quantity of VC advice and monitoring to portfolio companies. Future work could also consider other countries around the world. IPO markets in many countries around the world have experienced relatively more growth than the U.S. market in recent years. How VCs interact with portfolio companies to create long-term value creation after they fully exit after IPO in different cultural and legal settings could be a very fruitful avenue of future research.

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Tables and Figures

Table 1: Sample distribution by IPO years

This table includes the distribution of VC-backed and non-VC-backed IPO companies by IPO year along with the number of companies in which the lead VC has already exited, the average lead VC's exit time, the percentage of PCs that are acquired post-IPO, and the percentage of PCs that went bankrupt.

	VC-backed IPOs	Non-VC-backed IPOs	Exited VCs each year	Exited VCs by IPO year	Exit time (in years)	% of M&A exits	% of bankruptcy
2004	74	67	2	67	3.25	14.93	4.48
2005	44	81	18	38	3.56	10.53	10.53
2006	53	67	25	48	3.23	25.00	6.25
2007	76	51	28	63	3.49	19.05	3.17
2008	7	10	47	6	1.83	33.33	16.67
2009	11	26	25	9	2.96	0.00	11.11
2010	39	32	35	35	3.48	11.43	11.43
2011	39	29	18	32	2.69	6.25	3.13
2012	45	37	22	44	2.57	27.27	4.55
2013	66	60	49	49	2.35	12.24	6.12
2014	95	66	39	57	2.44	19.30	3.51
2015			50				
2016			41				
2017			32				
2018			17				
Total	549	526	448	448	2.90		

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Table 2: VC characteristics

We report mean (median) and t-stats for the mean difference between the two samples – VC-backed and non-VC-backed IPO companies as well as VC-present and VC-absent companies. We include investee firm characteristics, IPO characteristics, and VC characteristics in Panels A, B, and C respectively. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Panel A: Firm characteristics	(1)	(2)	(3)	(4)	(5)	(6)
	VC-backed	Non-VC-backed	Diff (t-stats)	VC-present	VC-absent	Diff (t-stats)
Tobin's Q	3.31	1.87	31.67***	3.41	3.33	0.85
	(2.77)	(1.51)		(2.84)	(2.83)	
R&D	0.22	0.05	34.39***	0.24	0.20	4.56***
	(0.16)	(0.01)		(0.19)	(0.14)	
Capital expenditures	0.04	0.07	-16.05***	0.04	0.04	0.33
	(0.02)	(0.04)		(0.02)	(0.02)	
Size	5.68	6.42	-17.36***	5.10	6.28	-18.76***
	(5.76)	(6.50)		(5.28)	(6.29)	
Leverage	0.10	0.30	-39.37***	0.10	0.09	1.69*
	(0.01)	(0.30)		(0.01)	(0.00)	
ROE	-0.25	0.02	-13.34***	-0.23	-0.27	0.99
	(-0.08)	(0.08)		(-0.06)	(-0.08)	
Cash	0.56	0.14	68.24***	0.57	0.52	4.51***
	(0.57)	(0.07)		(0.60)	(0.54)	
No of observations	2902	3589		1170	1146	

Panel B: IPO characteristics	VC-backed	Non-VC-backed	Diff (t-stats)
Offer size (mil)	138.68	313.29	-3.53***
	(77.45)	(160.40)	
Offer price	13.19	15.41	-5.53***
	(12.25)	(15.00)	
Underpricing	21.63	12.16	4.40***
	(16.66)	(7.83)	
PC age at IPO	9.37	29.50	-15.11***
	(8.00)	(18.00)	
No of observations	448	526	

Panel C: VC characteristics	Mean	Median
VC ownership at the IPO	15.39	14.35
Pre-IPO holding period	5.93	5.71
Distance	844.44	271.00
Value reputation	.02	0.01
Investment portfolio share	.1	0.05
Syndicate size	10.1	9.00
No of observations	432	432

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Table 3: VC-backed IPO returns

We report mean (standard deviation) differences in monthly returns (Panel A) and firm-level alphas (Panel B) between months where the VC is present and exited. Columns (1) to (3) include the full sample, Columns (4) to (6) exclude VC exited through M&A, and Columns (7) to (9) require 12 months of data following the IPO and the exit. Panel A shows monthly returns and three different excess returns (return–risk free rate; return–value-weighted CRSP index; return–IPO portfolio). The IPO portfolio consists of all non-VC-backed IPO companies held for 60-months following their IPO. Panel B shows firm-level alphas from one-, three-, and five- Fama-French factor models. The full sample in Panel B indicates that the firm must have at least six-months of data following the exit and the IPO. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Observation averages		Full Sample			Excluding M&A exits			>12 months of data	
	Present	Exit	Diff	Present	Exit	Diff	Present	Exit	Diff
Raw Return	1.552	1.551	0.00	1.652	1.540	0.06	1.507	1.494	0.01
	(23.973)	(17.058)		(24.661)	(17.044)		(24.101)	(16.900)	
Return-Rf	1.462	1.480	-0.02	1.567	1.469	0.04	1.420	1.424	-0.00
	(23.978)	(17.063)		(24.665)	(17.048)		(24.106)	(16.904)	
Return-CRSP index	0.876	0.619	0.26	0.949	0.608	0.31	0.838	0.567	0.27
	(23.441)	(16.254)		(24.099)	(16.240)		(23.563)	(16.086)	
Return-IPO portfolio	1.050	0.755	0.30	1.171	0.742	0.34	1.021	0.708	0.31
	(23.353)	(16.171)		(23.973)	(16.161)		(23.476)	(16.007)	
No of observations	10,538	10,361		7,832	10,302		10,211	10,275	
Panel B: Firm level averages									
Alpha-Market model	1.016	0.254	0.76**	1.020	0.243	0.78**	0.946	0.257	0.69**
	(4.52)	(2.82)		(4.73)	(2.83)		(4.07)	(2.84)	
Alpha - 3-Factor	1.233	0.317	0.92**	1.455	0.312	1.14**	1.059	0.325	0.73*
	(6.10)	(3.12)		(6.37)	(3.13)		(4.90)	(3.13)	
Alpha - 5-Factor	8.689	0.137	8.55	10.807	0.147	10.66	1.737	0.432	1.30***
	(121.51)	(6.32)		(138.08)	(6.36)		(6.56)	(3.12)	
No of observations	327	225		253	221		292	221	

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Table 4: Calendar time VC-backed IPO returns

We estimate returns using a market and Fama-French three-factor model using a rolling portfolio of VC-backed IPO stocks. In Columns (1) to (3), we report estimated coefficients for all VC-backed IPO companies with a holding period of 60 months, as in Brav and Gompers (1997). In Columns (4) to (6), we limit the holding period until the lead VC's exit (VC Present), while in Columns (7) to (9), we include the time period until 60 months following the lead VC's exit (VC exit). To estimate the Fama-French three-factor model, we use factors available in Kenneth French's website in Columns (2), (5), and (8) and use factors purged from venture capital backed IPO companies in Columns (3), (6), and (9). We include the definitions of all variables in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All VC-Backed 60-Months			VC Present up to 60-Months			VC Exited up to 60-Months		
Alpha	0.320	0.303	0.212	0.911*	0.875*	0.804*	0.290	0.301	0.170
	(0.82)	(1.02)	(0.69)	(1.78)	(1.85)	(1.68)	(0.71)	(0.92)	(0.50)
Market - Rf	1.315***	1.140***	1.096***	1.253***	1.141***	1.094***	1.312***	1.109***	1.075***
	(14.72)	(13.46)	(13.25)	(8.77)	(6.65)	(6.62)	(15.65)	(15.79)	(15.77)
SMB		1.245***	1.167***		0.890***	0.885***		1.362***	1.278***
		(8.16)	(7.98)		(3.08)	(3.49)		(10.54)	(9.56)
HML		-0.911***	-1.057***		-0.728***	-0.867***		-0.821***	-0.992***
		(-8.81)	(-8.48)		(-3.19)	(-3.30)		(-6.59)	(-6.51)
No of months	191	191	191	178	178	178	180	180	180
R-squared	0.514	0.695	0.680	0.364	0.448	0.448	0.509	0.694	0.680
Factors	Normal	Normal	Purged	Normal	Normal	Purged	Normal	Normal	Purged

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Table 5: PC performance pre- and post-VC exit

We estimate returns using market, Fama-French three-factor, and Fama-French five-factor models using equally-weighted calendar-time portfolios of VC-backed IPO stocks with a holding period until the lead VC's exit (VC Present) and until 60 months following the exit (VC exit). In Columns (7) to (9), we form long-short portfolios of VC-present and VC-absent samples and examine the difference in their performance. The SMB, HML, RMW, and CMA factors are purged from venture capital backed companies' returns. We replace the returns with the risk-free rate when we do not have overlapping portfolio observations in the long-short portfolios to account for the alternative cost of not investing the capital. We include the definitions of all variables in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	VC Present			VC Exited			VC Present - VC Exited		
Alpha	1.216**	1.111**	1.789***	0.400	0.319	0.646**	0.764*	0.740	1.078**
	(2.42)	(2.36)	(3.55)	(1.16)	(1.18)	(2.45)	(1.72)	(1.63)	(2.17)
Market - Rf	1.206***	1.033***	0.876***	1.322***	1.087***	1.018***	-0.130	-0.073	-0.147
	(8.58)	(6.37)	(5.78)	(17.72)	(17.82)	(17.44)	(-0.99)	(-0.48)	(-1.01)
SMB		0.939***	0.773***		1.224***	1.153***		-0.236	-0.326
		(3.85)	(3.21)		(10.79)	(10.51)		(-1.02)	(-1.38)
HML		-0.881***	-0.741***		-0.815***	-0.730***		-0.017	0.055
		(-3.47)	(-3.19)		(-7.22)	(-5.31)		(-0.07)	(0.22)
RMW			-1.690***			-0.804***			-0.855**
			(-5.01)			(-3.87)			(-2.45)
CMA			-1.582**			-0.683**			-0.609
			(-2.36)			(-1.99)			(-0.92)
No of months	179	179	179	180	180	180	191	191	191
R-squared	0.361	0.454	0.523	0.591	0.755	0.775	0.008	0.015	0.045

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Table 6: Tobin's Q and VC presence

This table shows the effect of lead VC presence on the PC's Tobin's Q ratio. In Model (1), we estimate VC firm and year fixed-effects regressions. In Models (2) to (5), we address endogeneity concerns using a two-stage least-squared method with deviation from average VC fund total investment horizon and deviation from average industry total investment horizon as instrumental variables. Lead VC presence is an indicator variable taking the value of one when lead VC is present in a given year, and zero otherwise. All accounting controls enter the model with one lag. Reputation, Distance, Investment, and Portfolio share are measured at the IPO. All variables are defined in Appendix A1. Heteroscedasticity-robust *t*-stats based on standard errors clustered by VC firm are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1) Tobin's Q	(2) Lead VC Presence 1st Stage	(3) Tobin's Q 2nd Stage	(4) Lead VC Presence 1st Stage	(5) Tobin's Q 2nd Stage
Lead VC presence	0.351**		3.107*		2.370***
	(2.18)		(1.98)		(2.94)
Deviation from VC fund average		0.021***			
		(3.17)			
Deviation from industry average				0.051***	
				(5.28)	
Size	0.379***	-0.083***	0.668***	-0.077***	0.531***
	(5.76)	(-7.62)	(4.34)	(-7.73)	(5.14)
Leverage	1.066**	0.040	1.560**	0.086	1.090*
	(2.10)	(0.56)	(2.36)	(1.20)	(1.79)
ROE	0.067	-0.012	0.092	-0.011	0.085
	(1.18)	(-0.73)	(1.14)	(-0.83)	(1.18)
Cash	0.821**	0.122	0.799	0.059	0.465
	(2.22)	(1.45)	(1.33)	(0.81)	(1.02)
Reputation	-6.808**	0.424	-7.610**	0.022	-7.407*
	(-2.06)	(0.57)	(-2.08)	(0.02)	(-1.82)
Distance	-0.096*	-0.002	-0.080	0.000	-0.094*
	(-1.96)	(-0.24)	(-1.51)	(0.03)	(-1.74)
Investment portfolio share	-0.754	0.063	-1.395	0.032	-1.321
	(-1.01)	(0.33)	(-1.33)	(0.18)	(-1.36)
Constant	1.236**	0.914***		0.914***	
	(2.49)	(9.92)		(10.56)	
VC FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
No of observations	2084	1479	1479	1982	1982
F-stat		10.05		27.91	
R-squared (pseudo)	0.353	0.422	-0.178	0.513	-0.089

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Table 7: Single sorts of Syndicate Size and Reputation

This table shows the effect of reputation and syndicate size on the returns of VC-backed IPOs in a calendar time regression framework. We conduct monthly sorts based on reputation within the present and exit portfolios in the Columns (1) to (4) and repeat the same process for syndicate size in Columns (5) to (8). Low (High) portfolios include the PCs with a below (above) median reputation. Small (Large) are portfolios including the PCs with a below (above) median syndicate size. Reputation and syndicate size are measured at the IPO date. All portfolio returns are the net of the risk-free rate. The SMB, HML, RMW, and CMA factors are purged from IPO returns. All variables are defined in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Present		Exit		Present		Exit	
	Reputation				Syndicate Size			
	Low	High	Low	High	Small	Large	Small	Large
Alpha	1.236**	2.159***	0.242	0.938**	1.985***	1.537***	0.021	0.856**
	(2.14)	(3.50)	(0.68)	(2.25)	(2.82)	(3.04)	(0.04)	(2.60)
Market - Rf	0.727***	1.040***	1.034***	1.038***	0.961***	0.837***	1.107***	0.984***
	(4.59)	(5.58)	(14.86)	(12.31)	(3.88)	(6.42)	(12.79)	(12.87)
SMB	0.898***	0.611*	0.994***	1.381***	0.620	0.906***	1.213***	1.217***
	(3.98)	(1.78)	(7.39)	(7.97)	(1.61)	(4.30)	(7.71)	(8.78)
HML	-0.661**	-0.980***	-0.638***	-0.964***	-0.548*	-0.975***	-0.614***	-0.937***
	(-2.34)	(-4.12)	(-4.17)	(-5.36)	(-1.78)	(-3.90)	(-2.95)	(-6.22)
RMW	-1.447***	-2.084***	-0.826***	-0.763***	-1.424***	-1.964***	-0.166	-1.060***
	(-3.74)	(-4.40)	(-2.71)	(-3.10)	(-3.20)	(-5.52)	(-0.37)	(-3.54)
CMA	-1.285*	-1.578*	-0.696*	-0.428	-1.626*	-1.416**	-0.794*	-0.495
	(-1.82)	(-1.87)	(-1.75)	(-0.99)	(-1.68)	(-2.18)	(-1.68)	(-1.12)
Observations	176	179	180	180	176	179	180	180
R-squared	0.335	0.541	0.529	0.724	0.335	0.541	0.529	0.724

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Table 8: Double sorts of Syndicate Size and Reputation

This table shows the effect of reputation and syndicate size on the returns of VC-backed IPOs in a calendar time regression framework. Columns (1) to (4) show the results with VCs present, and Columns (5) to (8) show the results with VCs exit. We conduct monthly double sorts within the present and exit portfolios, first on Syndicate size, and then on Reputation. Small (Large) are portfolios including the PCs with a below (above) median syndicate size. Low (High) portfolios include the PCs with a below (above) median reputation. Reputation and syndicate size are measured at the IPO date. All portfolio returns are a net of the risk-free rate. The SMB, HML, RMW, and CMA factors are purged from IPO returns. All variables are defined in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Present				Exit			
Syndicate:	Small		Large		Small		Large	
Reputation	Low	High	Low	High	Low	High	Low	High
Alpha	1.622***	2.062**	1.292*	1.659***	-0.252	0.520	0.405	1.153***
	(2.61)	(2.36)	(1.86)	(3.04)	(-0.42)	(0.82)	(0.84)	(2.89)
Market - Rf	0.564***	1.500***	0.798***	0.849***	1.113***	1.073***	0.973***	0.996***
	(2.97)	(3.61)	(4.24)	(7.33)	(10.65)	(8.65)	(9.95)	(10.33)
SMB	1.106***	0.192	0.913***	0.871***	1.243***	1.139***	0.910***	1.534***
	(4.18)	(0.32)	(3.29)	(3.45)	(6.19)	(5.48)	(4.89)	(6.75)
HML	-0.691**	-0.780**	-0.708*	-1.383***	-0.283	-1.073***	-0.866***	-1.062***
	(-2.37)	(-2.38)	(-1.84)	(-5.31)	(-1.10)	(-4.28)	(-4.31)	(-5.56)
RMW	-1.639***	-0.980	-1.885***	-2.218***	0.051	-0.935***	-1.306***	-0.858***
	(-3.90)	(-1.49)	(-3.84)	(-5.12)	(0.10)	(-3.24)	(-3.05)	(-2.71)
CMA	-1.201	-1.832	-1.373*	-1.149	-0.897	-0.526	-0.761	-0.258
	(-1.59)	(-1.50)	(-1.70)	(-1.55)	(-1.52)	(-1.00)	(-1.47)	(-0.47)
Observations	175	168	179	178	180	175	180	177
R-squared	0.400	0.244	0.386	0.501	0.508	0.323	0.557	0.655

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Table 9: Triple sorts of Syndicate Size, Pre-IPO Holding Period, and Reputation

This table shows the effect of syndicate size, VC reputation, and pre-IPO holding period on the returns of VC-backed IPOs in a calendar time regression framework. Panel A shows the results with VCs exited, and Panel B shows the results with VCs present. We conduct monthly triple sorts within the present and exit portfolios, first on Syndicate size, second on Reputation, and third on Pre-IPO Holding Period. Small (Large) are portfolios including the PCs with a below (above) median syndicate size. Low (High) portfolios include the PCs with a below (above) median reputation. Short (Long) portfolios include the PCs with a below (above) median length of VC's pre-IPO holding period. Syndicate size, reputation, and pre-IPO holding period are measured at the IPO. All portfolio returns are a net of the risk-free rate. The SMB, HML, RMW, and CMA factors are purged from IPO returns. All variables are defined in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A:	Post-Exit							
Syndicate	Small				Large			
Reputation	Low		High		Low		High	
Pre-IPO Holding period	Short	Long	Short	Long	Short	Long	Short	Long
Alpha	0.299	-0.014	0.628	0.543	0.421	0.290	0.675	1.415***
	(0.59)	(-0.02)	(0.60)	(0.92)	(0.59)	(0.65)	(1.18)	(2.96)
Market - Rf	1.075***	1.068***	1.069***	1.053***	0.948***	1.025***	1.060***	0.826***
	(10.05)	(7.60)	(5.05)	(7.92)	(6.24)	(9.22)	(7.74)	(6.36)
SMB	1.262***	1.117***	1.498***	0.805***	1.069***	0.856***	1.502***	1.607***
	(5.57)	(4.27)	(3.81)	(3.49)	(3.97)	(4.50)	(5.37)	(5.90)
HML	-0.420	-0.365	-1.040***	-1.169***	-1.224***	-0.502**	-0.911***	-1.157***
	(-1.59)	(-1.11)	(-3.08)	(-3.42)	(-3.67)	(-2.15)	(-3.39)	(-4.63)
RMW	-0.627	-0.237	-1.120***	-0.689*	-1.798***	-0.503	-0.507	-1.205***
	(-1.64)	(-0.41)	(-2.62)	(-1.80)	(-2.72)	(-1.34)	(-1.08)	(-3.19)
CMA	-0.782	-0.813	-0.751	-0.187	-0.628	-0.524	0.106	-0.555
	(-1.31)	(-1.15)	(-0.97)	(-0.33)	(-0.82)	(-0.82)	(0.14)	(-0.81)
Observations	168	180	168	172	177	180	177	174
R-squared	0.547	0.393	0.160	0.403	0.403	0.519	0.479	0.538

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel B:	VC Present							
Syndicate	Small				Large			
Reputation	Low		High		Low		High	
Pre-IPO Holding period	Short	Long	Short	Long	Short	Long	Short	Long
Alpha	2.206***	0.871	1.875	1.929***	0.719	2.090**	1.083*	1.264
	(3.11)	(1.17)	(1.49)	(2.92)	(0.90)	(2.49)	(1.67)	(1.52)
Market - Rf	0.656***	0.614***	1.703***	0.934***	1.002***	0.690***	0.931***	0.842***
	(3.47)	(2.67)	(3.42)	(6.66)	(4.88)	(3.04)	(5.18)	(5.27)
SMB	1.348***	1.105***	0.240	0.799***	0.851**	0.987***	0.938***	0.790**
	(5.06)	(3.14)	(0.31)	(3.13)	(2.52)	(2.97)	(2.69)	(2.42)
HML	-0.872***	-0.572	-0.803*	-0.610*	-0.627**	-0.697	-1.483***	-1.349***
	(-3.61)	(-1.55)	(-1.78)	(-1.80)	(-1.98)	(-1.27)	(-3.90)	(-4.48)
RMW	-2.312***	-0.303	-1.413	-0.751	-1.874***	-2.149***	-1.976***	-2.198***
	(-3.48)	(-0.59)	(-1.54)	(-1.39)	(-2.72)	(-3.88)	(-3.33)	(-3.45)
CMA	-1.835***	-1.136	-2.146	-1.038	-1.617*	-1.808*	-1.705*	0.351
	(-2.71)	(-1.21)	(-1.11)	(-1.30)	(-1.84)	(-1.76)	(-1.83)	(0.36)
Observations	169	174	167	164	170	178	178	166
R-squared	0.453	0.222	0.203	0.340	0.351	0.271	0.396	0.325

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Table 10: Sorts of VC Reputation and R&D

This table shows the effect of R&D and VC-reputation on the returns of VC-backed IPOs in a calendar time regression framework. We first form portfolios based on VC presence (Present) in Columns (1) to (4) and absence (Exit) in Columns (5) to (8). We then conduct monthly double sorts within the present and exit portfolios, first on Reputation, and second on R&D. Low (High) portfolios include the PCs with a below (above) median reputation. Low (High) are portfolios including the PCs with a below (above) median R&D. Reputation is measured at the IPO and R&D with a one-year lag. All portfolio returns are a net of the risk-free rate. The SMB, HML, RMW, and CMA factors are purged from IPO returns. All variables are defined in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Present				Exit			
Reputation	Low		High		Low		High	
R&D	Low	High	Low	High	Low	High	Low	High
Alpha	0.941	1.423*	1.158**	2.662***	0.437	0.736	0.571	1.789*
	(1.59)	(1.78)	(2.38)	(2.95)	(1.24)	(0.79)	(1.34)	(1.79)
Market-Rf	0.712***	0.815***	0.879***	1.110***	1.080***	0.879***	1.002***	1.150***
	(4.70)	(3.97)	(6.84)	(4.12)	(11.72)	(6.08)	(8.45)	(6.30)
SMB	1.145***	0.573*	1.164***	0.326	1.093***	0.866***	1.172***	1.787***
	(4.63)	(1.77)	(5.65)	(0.64)	(7.47)	(2.96)	(6.38)	(5.05)
HML	-0.579**	-0.631*	-1.028***	-1.020***	-0.793***	-1.045***	-0.820***	-1.395***
	(-2.23)	(-1.89)	(-5.58)	(-2.85)	(-4.26)	(-3.62)	(-3.40)	(-4.42)
RMW	-1.255***	-2.055***	-0.992**	-2.963***	-1.046***	-1.684**	-0.902***	-0.560
	(-3.02)	(-3.41)	(-2.13)	(-4.51)	(-3.49)	(-2.08)	(-2.98)	(-1.12)
CMA	-2.035***	-0.838	-0.415	-2.365*	-0.579	-0.661	-0.748*	0.255
	(-2.78)	(-0.87)	(-0.90)	(-1.81)	(-1.40)	(-0.86)	(-1.67)	(0.29)
Observations	178	176	158	178	174	175	177	177
R-squared	0.418	0.329	0.549	0.332	0.729	0.305	0.598	0.190

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Table 11: Sorts of VC Reputation and Capital Expenditures

This table shows the effect of VC reputation and capital expenditures on the returns of VC-backed IPOs in a calendar time regression framework. We first form portfolios based on VC presence (Present) in Columns (1) to (4) and absence (Exit) in Columns (5) to (8). We then conduct monthly double sorts within the present and exit portfolios, first on Reputation, and second on CAPEX. Low (High) portfolios include the PCs with a below (above) median reputation, calculated as in Nahata (2008). Low (High) are portfolios including the PCs with a below (above) median CAPEX. Reputation is measured at the IPO and CAPEX with a one-year lag. All portfolio returns are a net of the risk-free rate. The SMB, HML, RMW, and CMA factors are purged from IPO returns. All variables are defined in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Present				Exit			
Reputation	Low		High		Low		High	
CAPEX	Low	High	Low	High	Low	High	Low	High
Alpha	1.511**	0.485	1.970**	1.974***	0.631	0.306	1.263**	0.228
	(2.24)	(0.81)	(2.33)	(3.66)	(1.43)	(0.37)	(2.45)	(0.45)
Market - Rf	0.869***	0.744***	1.088***	0.985***	1.052***	0.938***	1.147***	0.930***
	(4.91)	(4.72)	(4.42)	(6.18)	(11.93)	(7.34)	(11.15)	(8.50)
SMB	1.108***	0.924***	0.617	0.782***	0.843***	1.039***	1.540***	1.218***
	(4.06)	(3.72)	(1.31)	(2.82)	(5.14)	(4.19)	(7.39)	(6.01)
HML	-0.823***	-0.569**	-0.952***	-0.923***	-1.106***	-0.468*	-1.130***	-0.772***
	(-3.86)	(-2.05)	(-3.17)	(-4.05)	(-5.38)	(-1.87)	(-5.22)	(-3.25)
RMW	-2.065***	-0.868**	-2.294***	-1.607***	-1.331***	-1.074	-0.820**	-0.764**
	(-3.57)	(-2.17)	(-3.75)	(-3.62)	(-3.71)	(-1.41)	(-2.59)	(-2.02)
CMA	-2.149***	-0.584	-1.390	-1.621**	-0.072	-0.782	-0.273	-0.630
	(-2.95)	(-0.73)	(-1.11)	(-2.49)	(-0.12)	(-1.35)	(-0.50)	(-1.11)
Observations	170	177	166	177	174	175	177	177
R-squared	0.481	0.349	0.354	0.469	0.592	0.380	0.466	0.514

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Appendices

Appendix A1: Variable definitions

Variable	Definition	Source
Lead VC presence	Dummy variable equals one if a lead VC is present in a PC in a given period, and zero otherwise	Hand collection
Tobin's Q	Market-to-book ratio calculated as (total assets+common shares outstanding*price-book value of equity)/total assets.	Compustat
Deviation from VC fund average	Difference in years between lead VC's time since first investment and average exit time for the VC fund. We calculate the average VC fund exit time after excluding the specific investment.	Hand collection
Deviation from industry average	Difference in years between lead VC's time since first investment and average exit time within industry We calculate the average VC industry exit time after excluding the specific investment.	Hand collection
Size	Natural logarithm of market capitalization of a PC where market capitalization is calculated by multiplying the number of common shares outstanding with the closing stock price of the period	Compustat
Leverage	Ratio of total debt to total assets	Compustat
ROE	Ratio of Ratio of net income to total equity.	Compustat
Cash	Ratio of cash holdings to total assets	Compustat
Reputation	Ratio of the market capitalization of all lead VC IPO involvements during the past five years to the market capitalization of all VC-backed IPOs during the same period.	SDC
Distance	Natural logarithm of distance (in miles) between a VC and its PC	SDC
Investment portfolio share	Ratio of a VC's total funds invested in a PC to total funds invested by all VCs in the PC	SDC
Syndicate	Total number of VC funds invested in a PC	SDC
Pre-IPO holding period	Difference in years between the lead VC's first investment date and the PC's IPO date	SDC
R&D	Ratio of research and development expenses to total assets	Compustat
CAPEX	Ratio of capital expenditures to total assets	Compustat
Variable related to Asset pricing models		
Rf	Risk-free rate of return	Kenneth French's website
SMB	Difference between returns on diversified portfolios of small stocks and big stocks	Kenneth French's website
HML	Difference between returns on diversified portfolios of high and low book-to-market stocks	Kenneth French's website
RMW	Difference between returns on diversified portfolios of robust and weak profitability stocks	Kenneth French's website
CMA	Difference between returns on diversified portfolios of stocks of low and high investment companies	Kenneth French's website

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Table A2: VC-backed IPO returns compared to IPO returns

We compare the returns of VC-backed and non-VC-backed IPO companies. We use a Fama-French five-factor model to estimate returns. In Columns (1) and (2), we compare our entire sample of VC-backed IPO companies with non-VC-backed IPO companies. In Models (3) and (4), we compare VC-present companies with non-VC-backed companies, while in Models (5) and (6), we compare VC-absent companies with non-VC-backed companies. The SMB, HML, RMW, and CMA factors are purged from VC-backed companies' returns. We replace the returns with the risk-free rate when we do not have overlapping portfolio observations in the long-short portfolios. All variable definitions can be found in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Non-VC	IPO Ret	VC Present – Non-VC	VC Present – Non-VC	VC Exit – Non-VC	VC Exit – Non-VC
Alpha	0.057	-0.151	1.619***	1.241**	0.541*	0.478
	(0.26)	(-0.63)	(3.40)	(2.54)	(1.81)	(1.19)
Market - Rf	1.195***	1.228***	-0.320**	-0.292**	-0.173**	-0.235**
	(17.38)	(16.18)	(-2.27)	(-2.14)	(-2.20)	(-2.19)
SMB	0.733***	0.409***	0.042	0.461**	0.368**	0.149
	(6.13)	(3.42)	(0.18)	(2.18)	(2.58)	(0.80)
HML	0.013	-0.120	-0.631***	-0.928***	-0.687***	-0.705***
	(0.09)	(-0.74)	(-2.89)	(-3.35)	(-3.37)	(-2.68)
RMW	-0.077	-0.075	-1.468***	-1.241***	-0.613**	-0.723**
	(-0.37)	(-0.38)	(-4.30)	(-3.47)	(-2.18)	(-2.00)
CMA	-0.136	-0.588	-1.248**	-0.901	-0.639	0.307
	(-0.46)	(-1.63)	(-2.03)	(-1.50)	(-1.50)	(0.60)
No of months	191	191	191	191	191	191
Weighting	EW	VW	EW	VW	EW	VW
R-squared	0.799	0.743	0.171	0.182	0.179	0.110

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Table A3: PC performance pre- and post-VC exit (Value-weighted portfolios)

We estimate returns using market, Fama-French three-factor, and Fama-French five-factor models using value-weighted calendar-time portfolios of VC-backed IPO stocks with a holding period until the lead VC's exit (VC Present) as well as until 60 months following exit (VC exit). In Models (7)-(9), we form long-short portfolios of VC-present and VC-exit samples and examine the difference in their performance. The SMB, HML, RMW, and CMA factors are purged from venture capital backed companies' returns. We replace the returns with the risk-free rate when we do not have overlapping portfolio observations in the long-short portfolios. We include the definitions of all variables in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	VC Present			VC Exit			VC Present - VC Exit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Alpha	0.776	0.596	1.202**	0.137	-0.013	0.306	0.536	0.485	0.774
	(1.51)	(1.31)	(2.55)	(0.37)	(-0.04)	(0.84)	(1.14)	(1.02)	(1.54)
Market - Rf	1.234***	1.077***	0.939***	1.175***	1.066***	0.993***	-0.007	-0.067	-0.129
	(10.28)	(8.91)	(7.66)	(16.67)	(14.41)	(13.31)	(-0.06)	(-0.58)	(-1.09)
SMB		0.996***	0.870***		0.698***	0.576***		0.347	0.312
		(5.16)	(4.50)		(4.17)	(3.31)		(1.61)	(1.43)
HML		-1.384***	-1.206***		-0.881***	-0.918***		-0.410*	-0.248
		(-6.43)	(-5.66)		(-5.36)	(-4.81)		(-1.89)	(-1.03)
RMW			-1.495***			-0.927***			-0.692*
			(-4.52)			(-3.03)			(-1.84)
CMA			-1.748***			-0.074			-1.106
			(-3.14)			(-0.18)			(-1.63)
No of months	179	179	179	180	180	180	191	191	191
R-squared	0.362	0.518	0.575	0.498	0.598	0.623	0.000	0.026	0.054

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Table A4: Portfolios with a minimum of 10 assets.

We estimate returns using market and Fama-French five-factor models using equally-weighted calendar-time portfolios of VC-backed IPO stocks with holding period until their exit (VC Present) as well as until 60 months following exit (VC exit), with the restrictions that the test portfolios must at least consists of 10 assets. The SMB, HML, RMW, and CMA factors are purged from VC- backed companies' returns. We replace the returns with the risk-free rate when we do not have overlapping portfolio observations in the long-short portfolios. We include the definitions of all variables in Appendix A1. Autocorrelation and heteroscedasticity-robust *t*-stats are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1) VC Present	(2) VC Exit	(3) VC Present	(4) VC Exit	(5) VC Present – VC Exit
Alpha	0.838*	0.309	1.520***	0.489**	1.100**
	(1.81)	(0.88)	(3.51)	(2.00)	(2.44)
Market - Rf	1.286***	1.323***	0.902***	1.038***	-0.142
	(10.46)	(17.51)	(7.64)	(18.37)	(-1.28)
SMB			0.950***	1.150***	-0.221
			(4.80)	(11.24)	(-1.06)
HML			-0.862***	-0.882***	0.073
			(-4.92)	(-7.20)	(0.32)
RMW			-1.836***	-0.882***	-1.060***
			(-5.72)	(-4.38)	(-3.06)
CMA			-1.460**	-0.438	-0.710
			(-2.60)	(-1.34)	(-1.13)
No of months	163	168	163	168	163
R-squared	0.444	0.608	0.655	0.808	0.067

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Table A5: Tobin's Q and VC presence

This table shows the effect of lead VC presence on the PC's Tobin's Q ratio. In Model (1), we estimate industry and year fixed-effects regressions using a Fama-French 48-industry classification. In Models (2) to (5), we address endogeneity concerns using a two-stage least-squared method with deviation from average VC fund total investment horizon and deviation from average industry total investment horizon as instrumental variables. Lead VC presence is an indicator variable taking the value of one when lead VC is present in a given year, and zero otherwise. All accounting controls enter the model with one lag. Reputation, Distance, Investment, and Portfolio share are measured at the IPO. All variables are defined in Appendix A1. Heteroscedasticity-robust *t*-stats based on standard errors clustered on industry are provided in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	(1) Tobin's Q	(2) Lead VC Presence 1st Stage	(3) Tobin's Q 2nd Stage	(4) Lead VC Presence 1st Stage	(5) Tobin's Q 2nd Stage
Lead VC presence	0.301***		2.095***		1.627**
	(3.30)		(3.57)		(2.22)
Deviation from VC fund average		0.030***			
		(8.53)			
Deviation from industry average				0.028***	
				(8.08)	
Size	0.398***	-0.087***	0.585***	-0.079***	0.513***
	(11.39)	(-4.76)	(5.62)	(-6.48)	(5.81)
Leverage	1.357***	0.011	1.529***	0.111*	1.321***
	(4.91)	(0.13)	(4.07)	(2.04)	(3.91)
ROE	-0.018	-0.018*	0.064	-0.011	-0.014
	(-0.71)	(-1.85)	(0.78)	(-1.17)	(-0.53)
Cash	1.290**	0.041	1.130	0.015	1.235*
	(2.14)	(0.56)	(1.29)	(0.21)	(1.82)
Reputation	-2.883	0.636*	-4.591**	0.693	-3.641
	(-1.21)	(2.06)	(-2.37)	(1.71)	(-1.71)
Distance	-0.093**	-0.002	-0.093***	-0.003	-0.089***
	(-2.55)	(-0.41)	(-4.04)	(-0.51)	(-3.01)
Investment portfolio share	-0.813*	-0.073	-0.377	-0.121	-0.821*
	(-2.05)	(-0.76)	(-0.36)	(-1.43)	(-1.91)
Constant	0.750*	0.990***		0.958***	
	(1.84)	(6.80)		(10.79)	
Industry FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
No of observations	2094	1479	1479	1983	1983
F-stat		72.71		65.35	
R-squared (pseudo)	0.232	0.379	-0.012	0.325	0.038

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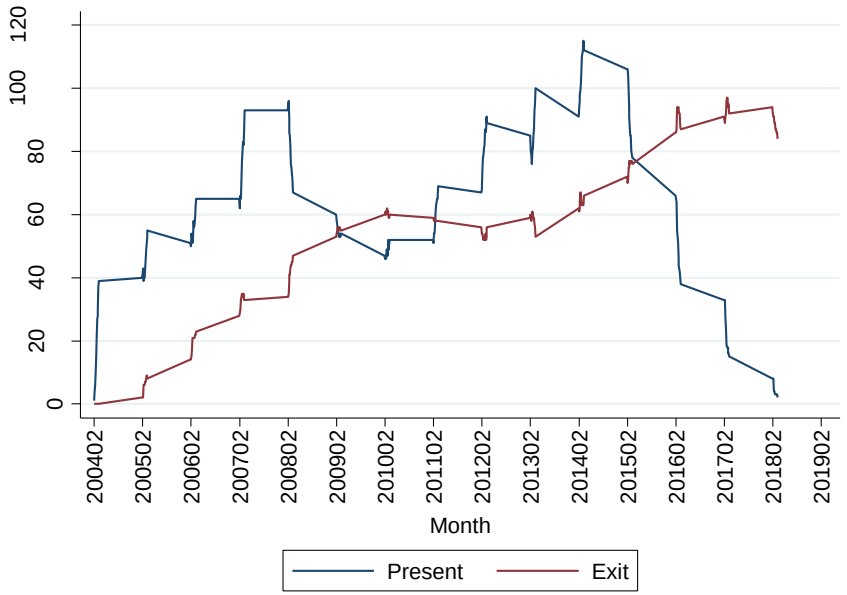
Figure A1: The number of portfolio assets over time

We include the number of portfolio assets by months that are available for VC-present and VC-absent samples during the time period 2004-2019. The blue line represents the figures for the PCs before the lead VC exits (Present), and the red line represents the figures for PCs after the lead VC exits (Exit).



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Internet Appendix

Table IA1: Calendar time VC-backed IPO returns using Newey-West standard errors

We estimate returns using a market and Fama-French three-factor and five-factor models using equally-weighted calendar-time portfolios of VC-backed IPO stocks with a holding period until the lead VC's exit (VC Present) and until 60 months following the exit (VC exit). To estimate the Fama-French factor models, we use factors available in Kenneth French's website. We include the definitions of all variables in Appendix A1. T-stats based on Newey and West (1987) standard errors using 12 lags are reported in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	All VC-Backed			VC Present			VC exited		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Alpha	-0.035	-0.033	0.366	1.191**	1.157**	1.777***	0.334	0.371	0.710***
	(-0.09)	(-0.14)	(1.21)	(1.99)	(2.24)	(3.10)	(1.03)	(1.28)	(2.90)
Market - Rf	1.300***	1.118***	0.960***	1.184***	1.060***	0.812***	1.329***	1.121***	0.996***
	(10.35)	(14.93)	(9.73)	(9.82)	(6.64)	(5.91)	(14.00)	(12.81)	(13.62)
SMB		1.199***	1.056***		0.957***	0.733***		1.277***	1.153***
		(6.83)	(7.66)		(3.61)	(2.94)		(9.01)	(10.22)
HML		-0.780***	-0.601***		-0.766***	-0.557***		-0.652***	-0.553***
		(-5.54)	(-3.66)		(-4.82)	(-3.93)		(-5.72)	(-3.43)
RMW			-0.960***			-1.534***			-0.880***
			(-3.52)			(-5.65)			(-6.61)
CMA			-0.574***			-0.770***			-0.342
			(-3.01)			(-2.63)			(-1.47)
Observations	191	191	191	179	179	179	180	180	180

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Table IA2: Calendar time VC-backed IPO returns with holding periods of 60-months following the IPO

We estimate returns using a market and Fama-French three-factor and five-factor models using a rolling portfolio of VC-backed IPO stocks with a holding period of 60-months following the IPO. In Columns (1) and (2), we report estimated coefficients for all VC-backed IPO companies with a holding period of 60 months, as in Brav and Gompers (1997). In Column (3) we augment the model with two additional factors (RMW and CMA). In Columns (4) to (6), we limit the holding period until the lead VC's exit (VC Present), while in Columns (7) to (9), we include the time period until 60 months to include only portfolio companies where the lead VC exited the investment (VC exit). To estimate the Fama-French factor models, we use factors available in Kenneth French's website. We include the definitions of all variables in Appendix A1. T-stats based on Newey and West (1987) standard errors using 12 lags are reported in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

	All VC-Backed			VC Present			VC exited		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Alpha	0.254	0.235	0.715**	0.995*	0.952**	1.589***	0.162	0.166	0.544*
	(0.58)	(0.78)	(2.13)	(1.77)	(2.07)	(2.98)	(0.42)	(0.50)	(1.77)
Market - Rf	1.305***	1.131***	0.938***	1.229***	1.134***	0.873***	1.334***	1.135***	0.989***
	(13.70)	(15.83)	(14.32)	(11.35)	(7.90)	(6.87)	(12.49)	(13.39)	(13.09)
SMB		1.242***	1.071***		0.827**	0.606*		1.355***	1.225***
		(7.81)	(9.18)		(2.57)	(1.93)		(9.67)	(11.36)
HML		-0.914***	-0.682***		-0.743***	-0.508***		-0.844***	-0.691***
		(-9.87)	(-8.79)		(-4.32)	(-3.34)		(-6.25)	(-4.36)
RMW			-1.148***			-1.505***			-0.941***
			(-6.60)			(-5.84)			(-5.58)
CMA			-0.746***			-0.860***			-0.514**
			(-5.06)			(-3.00)			(-2.19)
N	191	191	191	178	178	178	180	180	180

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