Does Venture Capital Reputation Matter? Evidence from Successful IPOs[*]

Vladimir I. Ivanov

School of Business,
University of Kansas
785.864.7545
vivanov@ku.edu

C.N.V. Krishnan

Weatherhead School of Management,
Case Western Reserve University
216.368.2116
cnk2@cwru.edu

Ronald W. Masulis

Owen Graduate School of Management,
Vanderbilt University
615.322.3687
ronald.masulis@owen.vanderbilt.edu

Ajai K. Singh

Weatherhead School of Management,
Case Western Reserve University
216.368.0802
ajai.singh@case.edu

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ABSTRACT: ***V***enture capitalist (VC) reputation is a valuable trait, which yields important competitive benefits. Yet a generally accepted measure is lacking. To address this need, we investigate the relation of alternative VC reputation measures to especially successful venture investments, namely IPOs and post-IPO long-run firm performance. Post-IPO firm performance is measured by three well known standards: industry-adjusted operating performance, market-to-book ratio, and long-run listing survival. We find that a VC's market share of VC-backed IPOs has the strongest and most consistent positive association with these post-IPO long-run performance metrics and with the frequency with which a VC's portfolio firms subsequently successfully go public. We also explore the relation between VC reputation and private equity networks, IPO demand, post-IPO VC involvement and corporate governance. We find that more reputable VCs excel on all these dimensions, which helps explain why firms backed by more reputable VCs have greater IPO success and better post-IPO performance.

*Keywords***:** Venture capital, reputation, long run performance, private equity network, corporate governance, Initial Public Offerings.

*JEL Classification Code***:** G24

1. Introduction

In markets with asymmetric information, firm reputation is a valuable asset that can yield important competitive advantages [Kreps and Wilson (1982), Milgrom and Roberts (1982) and Shapiro (1983)]. For specialized financial intermediaries such as venture capitalists (VCs), which face a large number of competitors, reputation can be particularly important.[1] Indeed, reputation is an important trait in commercial banking, investment banking and insurance.[2] Given the crucial nature of VC advisory services and risk capital they supply to privately held firms, a VC's reputation can have a strong affect on its investment opportunities and the terms on which these investments are made. Yet, little research exists on how best to measure VC reputation or the extent to which VC reputation is associated with better investment outcomes.

Given the lack of generally accepted measures of VC reputation, most academic studies which examine IPOs do not differentiate among VCs, treating them all as equally effective.[3] As a result, VCs with track records of many successful IPOs, such as Kleiner Perkins Caufield & Byers, are treated indistinguishably from young VCs with little experience, capital or visibility. This stands in sharp contrast to the standard practice in equity offering studies of distinguishing underwriters by reputation.[4] Thus, a reliable VC reputation measure would be beneficial to academic researchers as well as to private equity investors wanting to know which VCs are more likely to be more successful in bringing their portfolio firms public and realizing superior post-IPO performance, and to entrepreneurs wanting to know which VCs offer more valuable advice, support and contacts.[5]

A major objective of this study is to find a reliable and easy to estimate measure of VC reputation with the property that more reputable VCs show relatively stronger private equity performance. One attractive approach to measuring superior VC performance is to focus on IPO success, measured by future IPOs and post-IPO long-term performance. These are particularly relevant performance benchmarks since IPOs are generally the most profitable, publicly visible and easily measured VC investment outcomes. Megginson and Weiss (1991) observe that Kleiner Perkins came to the market with 10 different IPOs in their sample period (1983-1987), giving it great visibility in the marketplace.[6] Further, portfolio companies backed

[1] Approximately 1500 VC firms were active in the U.S. as of 2002, with the top quintile managing about 80% of industry capital according to Thomson Financial's VentureXpert, and "Gap between venture firms may grow", by Mark Boslet, *Wall Street Journal*, February 12, 2003.
[2] Holmstrom and Tirole (1997) develop a model emphasizing the importance of financial intermediary reputation.
[3] See for example Bradley and Jordan (2002) and Loughran and Ritter (2004).
[4] For example, Johnson and Miller (1988), Megginson and Weiss (1991), Carter and Manaster (1990), Carter, Dark and Singh (1998) and Loughran and Ritter (2004) all differentiate investment bankers by reputation.
[5] Smith (1999) reports early stage entrepreneurs choose VCs based on their reputation for funding successful firms.
[6] Since its founding in 1972, Kleiner Perkins has invested in a number of very large IPOs, including America Online, Amazon, Compaq, Google, Netscape and Sun. See their website: http://www.kpcb.com for further details.

by VCs with strong records of prior IPO performance are likely to experience broader investor interest in their IPOs, making completion of larger IPO more likely. In addition, repeated IPO success can give a VC better access to attractive future venture investment opportunities and at more generous terms as shown in Hsu (2004).[7] A greater likelihood of successful IPOs and better access to investment opportunities at lower prices, enable VCs to earn better returns and attain stronger reputations.[8]

We begin our analysis by selecting a set of promising VC reputation measures. For the reasons mentioned above, we select a VC's market share of completed venture-backed IPOs as one logical measure of VC reputation. This measure is similar to the Megginson and Weiss (1991) underwriter reputation measure, and captures a VC's IPO success rate relative to other VCs. We also select several VC reputation measures used in earlier studies. Gompers and Lerner (1999) suggest capital under management as a proxy for VC reputation. Gompers (1996) suggests VC age as VC reputation measure, while Lee and Wahal (2004) suggest VC firm age and the number of IPOs a VC backs. We also examine several other related measures.

Our next step is to compare these alternative VC reputation measures abilities to capture a VC's IPO success in terms of (1) long-term IPO issuer performance and (2) the frequency of future IPOs from a VC's investment portfolio. Post-IPO firm performance is measured by three well known standards: industry-adjusted operating performance, market-to-book ratio, and long-run listing survival. Given that VCs are generally subject to a post-IPO lock-up period of 180 days [Gompers and Lerner, 1998] and many VCs hold their stock for longer periods [see Gompers and Lerner (1998), and Field and Hanka (2001)], post-IPO performance is not only relevant to entrepreneurs receiving VC funding, but also to VC fund limited partners, who frequently receive IPO shares when their funds ultimately exit from these IPO firms.

To summarize, we begin our evaluation by examining the association of several well known metrics of post-IPO long-run performance with the following six alternative measures of VC reputation: (1) a VC's market share of completed venture-backed IPOs, *IPO Market Share,* (2) VC firm age, which captures experience and long term survival in the industry; two measures of firm size, namely (3) a VC's total capital under management, and (4) total investments made by a VC in all its portfolio companies, which capture a VC's economic importance and investor confidence in a VC's investment ability; and two measures of investment performance, namely (5) VC investment in portfolio companies going public divided by its total venture investment and (6) the frequency of IPOs in a VC's investment portfolio. We find a VC's *IPO Market Share*

[7] Our contacts at Apax Partners, a New York VC firm, confirm that higher ranked VCs see more overall deal flow.
[8] VC reputation measures based on IPO success are attractive alternatives to those based on fund returns as in Kaplan and Schoar (2005), where publicly available data is very limited. Moreover, VCs exercise great discretion in valuing portfolio investments, often delaying poor investment realizations until fund liquidation.

consistently has a positive relation with all the post-IPO long-run performance metrics we examine and this VC reputation measure dominates the alternatives in its ability to predict superior post-IPO performance. In addition, while VC backing improves an issuer's post-IPO success, VC reputation is a more important determinant of an issuer's long-run performance. These findings are robust to a battery of sensitivity tests.

To explore the causes for superior performance of more reputable VCs, we examine whether they invest in more promising ventures, and whether they strongly support the development of their portfolio firms through to a profitable exit. We find more reputable VCs have both these characteristics, which are likely to result in superior post-IPO performance. However, investing in more promising ventures can be the result of either having better investment opportunities or being more successful in selecting among these opportunities. To assess possible causes of VC investment success, we examine the characteristics of IPO issuers backed by VCs of differing reputation to understand their selection decisions and then re-examine our post-IPO long run performance results after controlling for this selection effect.

We follow this by expanding on earlier research which examines whether more reputable VCs are associated with greater post-IPO involvement and stronger corporate governance. Gompers and Lerner (1998), and Field and Hanka (2001) report that VCs frequently keep a portion of their equity stake after the IPO lockup period (usually 180 days) expires. Baker and Gompers (2003) report that VC backed IPO firms have more independent boards and less powerful CEOs. Hochberg (2005) finds VC-backed IPO firms are less likely to have a dual CEO-chairman of the board of directors. We extend this evidence by showing that more reputable VCs are significantly more likely to have large shareholdings and board positions 1, 2 and 3 years after an IPO. We also establish that portfolio firms of more reputable VCs are associated with corporate governance mechanisms that lessen CEO entrenchment. Specifically, more reputable VCs have a significantly lower probability of investing in firms with either a dual CEO-board chairman or founder-CEO, but have an insignificant association with staggered boards. We find our strongest VC reputation measure has a significant positive association with all three measures of post-IPO long-run performance, even after controlling for selection bias and issuer corporate governance features. This is further evidence that more reputable VCs excel in both venture investment selectivity and portfolio firm development.

As further evidence of post-IPO long run performance, we follow Gompers (1995) and examine the later growth prospects of IPO issuers, measured by R&D expenses to capital expenditures and R&D expenses plus capital expenditures to total assets, both averaged over the three-year post-IPO period. Both ratios show significantly greater growth for issuers backed by more reputable VCs.

Stronger post-IPO support by more reputable VCs can also enhance portfolio firm profitability while simultaneously limiting CEO entrenchment and thus, making these IPO issuers more attractive acquisition candidates. Given that the median takeover premium in the U.S. is over 30% [see Andrade, Mitchell, and Stafford (2001)], post-IPO acquisitions can be very profitable outcomes for VC funds and their limited partners. Examining the three-year post-IPO period, we find firms backed by more reputable VCs have a significantly higher acquisition frequency and a significantly higher average takeover premium paid. This is consistent with higher ranked VCs more effectively enhancing the post-IPO development of their portfolio firms, encouraging acquisitions, promoting bidding competition, and assisting firms in negotiations with potential acquirers.

We also examine another important dimension of VC success, namely the frequency of later IPOs in a VC's venture investment portfolio. We find more reputable VCs have a higher frequency of future IPO success and that *IPO Market Share* dominates other VC reputation measures as a predictor of future IPOs. In other words, VCs with a larger *IPO Market Share* are more successful in bringing firms public as a proportion of their venture investment portfolio.

To explore the causes for higher frequencies of IPOs in the venture investment portfolios of more reputable VCs, we examine how the quality of a VC's private equity network as well as IPO quality and investor demand varies by VC reputation. Recent studies by Hellmann and Puri (2002) and Hochberg, Ljungqvist and Lu (2007a) examine the importance of VC networking relationships for portfolio firm development. They find that after VCs invest in a firm, they draw on their networks of service providers including experienced executives, lawyers, accountants and investment bankers to help the firm succeed [Gorman and Sahlman (1989), Sahlman (1990)]. VCs that develop more influential networks have significantly better performance, as measured by the proportion of portfolio companies that have IPOs [Hochberg, Ljungqvist and Lu, 2007a]. Hochberg, Ljungqvist and Lu (2007b) argue that VC networks enhance VC investment selectivity by limiting competition in local VC markets. Following this line of research, we examine whether VC reputation is related to the strength of a VC's private equity networks, measured by its ties to highly ranked financial intermediaries around IPOs. We find more reputable VCs, measured by *IPO Market Share*, tend to work with more reputable lead underwriters, securities law firms, and auditors and attract larger VC syndicates. We also document that more reputable VCs back better quality IPOs, which experience higher investor demand. Thus, we conclude from our evidence that more reputable VCs have a greater ability to support the successful development of their portfolio firms.

The remainder of this paper is organized as follows. Section 2 describes the data and methodology, and provides descriptive statistics. Section 3 analyzes the link between VC

reputation measures and post-IPO issuer performance measures. Section 4 presents extensive sensitivity analyses. Section 5 analyzes VC monitoring and support of portfolio firms as a reason for post-IPO issuer performance, including the link between VC reputation and corporate governance. Section 6 analyzes the link between VC reputation and subsequent IPO success and the relations to private equity networks and IPO demand. Section 7 concludes.

2. Data and Methodology

2.1 IPO Sample Construction

Our sample consists of U.S. IPOs completed in the 1993-2004 period. IPO issue information including offer dates, offer prices, offer proceeds, original filing high and low offer prices, VC investors, and managing underwriters (i.e. lead and book managers) are taken from Thomson Financial's SDC Global New Issues database. Exchange listing dates come from The Center for Research in Security Prices (CRSP) database. All IPO issuer-related data including issuer net income, total assets, book value of equity, capital expenditures, research and development expenses, and asset and sales growth rates are taken from Compustat. We exclude IPOs (1) when stocks not listed on major exchanges or reported in the CRSP database within one month of the IPO date, and when any variable needed for our analysis (listed in Appendix A) is unavailable and (2) IPOs by financial intermediaries, limited partnerships, foreign corporations, reverse LBOs, spinoffs, carve-outs, unit offerings, small offerings under $5 million in global proceeds and IPOs with offer prices under $5 per share.[9]

2.2 Methodology for Evaluating VC Reputation Measures

We compare the ability of our VC reputation measures to explain IPO issuer long run performance and the frequency of subsequent IPOs, after controlling for major issue characteristics previously documented to influence post-issue performance. Our objective is *not* to show the consistent strength of all these alternative VC reputation measures, but rather to determine which VC reputation measure has the strongest associations with issuer post-IPO long–run performance and frequency of future IPOs. One complication with this experiment is that VCs tend to syndicate investments with other VCs, rather than invest alone [Lerner, 1994]. When a syndicate of VC investors backs an IPO issuer, VC reputation is calculated two ways: (1) we define "VC syndicate" reputation as the average reputation across all the VCs investing in a portfolio firm. This approach has the advantage of taking into account the past

[9] Researchers typically exclude non-operating companies such as REITs and closed-end funds, offers priced below $5, which are subject to the antifraud provisions of Securities Enforcement and Penny Stock Reform Act of 1990, and IPOs raising less than $5 million that can be registered under Regulation A's less stringent disclosure requirements.

performance of all the VCs involved in an IPO issuer and (2) the lead VC's reputation, since lead syndicate members have more influence over VC syndicate decisions and are more active in IPO firm development. This second approach is parallel to the Megginson and Weiss method for calculating underwriting reputation. We define a "lead" VC as having the largest issuer investment at the IPO date. If there are multiple leads, then we equally weight their individual reputation measures. A limitation to studying lead VCs is that the lead can change across funding rounds. As a result, the lead VC at the IPO date can differ from the lead two funding round earlier. Thus, we use *both* lead and syndicate reputation measures in our analysis.

To more rigorously evaluate the explanatory power of our VC reputation measures, we include a simple VC indicator, commonly used in the IPO literature, as an explanatory variable. To avoid falsely attributing underwriter reputation effects to VC reputation, we include underwriter reputation in our regressions. Our measures of IPO issuer long-run performance are estimated over the first 3 years after the IPO month. We avoid inducing survivorship bias in our post-IPO long run performance measures by including firm performance measure over periods less than 3 years, when issuers do not survive or remain listed for the entire 3 year post-IPO period. Finally, we run a battery of robustness checks on the results.

2.3 Post-IPO Performance Measures

We employ three measures of long-run IPO issuer performance, which are well-established in the existing literature [for example, see Moeller, Schlingeman and Stulz (2004), Gompers, Ishii and Metrick (2003), or Field and Karpoff (2002)], namely industry-adjusted operating performance (ROA), market-to-book, and listing survivorship. We also use two forward looking proxies for future growth, specifically the ratios of R&D to capital expenditures and R&D plus capital expenditures over total assets. All issuer performance measures are evaluated over the first three years following an IPO.

Our first measure of long-run performance is industry-adjusted rate of return on assets, *ROA*, defined as Net Income divided by Total Assets minus the industry median ROA for the same calendar period. This accounting measure of operating performance focuses on profitability per dollar of assets and is widely used in long-run performance studies. Each IPO firm is matched to a sample of non-issuers (firms with no public equity issues in the 3 years before or after the IPO date) based on the issuer's industry, which is measured by its 4-digit SIC code if there are at least 5 such firms, or else based on its 3-digit (or 2-digit) SIC code to obtain at least 5 non-issuing firms. We adjust for industry effects by subtracting the industry median, rather than its mean, to minimize the influence of outliers. Net Income (item *69*) and Total Assets (item *44*) are taken from the Compustat quarterly financial statement database. Since the

addition of new equity capital may take time to improve a firm's performance, we focus on a 3 year period and average the 3 industry-adjusted annual ROA figures. We minimize survivorship bias by using the n-quarter matched industry-adjusted ROA figures for issuers that do not survive for 3 full calendars years beyond the IPO date, where n is the maximum number of quarters less than 12 for which Compustat data is available. Finally, we winsorize the *ROA* figures at the 1% and 99% levels to mitigate the effect of outliers.

Our second measure of IPO long-run performance is an issuer's market to book equity ratio, *M/B*. Market to book is also used in many studies as a proxy for the growth prospects or real option value of the firm.[10] It is often used as a proxy for *Tobin's Q*, after adjusting for taxes. The book value of equity is defined as stockholders' equity plus balance sheet deferred taxes and investment tax credit, minus book value of preferred stock, which are respectively data items *60*, *52*, and *55* in Compustat's quarterly financial statement database. The market value of equity is defined as the number of shares outstanding (Compustat *Item 61*) multiplied by its stock price at the prior quarter's end (*Item 14*). The market to book ratio is measured at the end of the 12th quarter following the IPO. To avoid inducing survivorship bias in our measure of long-run performance, we use the n-quarter *M/B* figures for firms that do not survive 3 calendar years beyond the IPO date, where n is the maximum number of quarters less than 12 with data available in Compustat. We winsorize the M/B figures at the 1% and 99% levels to minimize the effects of outliers due to possible data problems.

Our third measure of long-run performance is stock exchange listing survival, *Listed*, which is an indicator variable that takes a value of 1 for firms that remain listed on the NYSE, Amex or Nasdaq (i.e., remain in the CRSP database) for 3 years following their IPOs or are merged or acquired by listed firms (which themselves remain listed for the remainder of the 3 calendar years following the IPO dates), and equal 0 otherwise (firms that become bankrupt, defunct, liquidated (CRSP delisting codes 400 and above)).[11] This is a measure of an issuer's long run financial strength. This measure should capture adverse effects of the pre-IPO accounting window dressing, which attempts to raise an IPO's investor demand by boosting pre-IPO earnings through cut backs in profitable investments at the expense of future profits and creative accounting. We expect more established VCs with greater reputation capital at risk to have greater incentives to discourage firms with poor long term prospects from window dressing or deferring profitable investment opportunities.

[10] Examples of well know studies that use market-to-book ratio as a performance measure are Jain and Kini (1994), Gompers, Ishii and Metrick (2003), and Moeller, Schlingemann and Stulz (2004).
[11] We examine the frequency and profitability of post-IPO acquisitions in a later section.

We also examine is whether firms backed by the more reputable VCs exhibit superior long term growth measured by the ratio of research and development expenditures (R&D) to capital expenditures, and the ratio of R&D expenses and capital expenditures to total assets computed using Compustat annual financial statement database. These two forward looking growth measures are averaged over 3 years after the IPO date. While firm growth doesn't always translate into greater share price, in the case of high growth IPO issuers this correlation is likely to be quite high. High growth could be an indication of superior VC investment selectivity, superior VC monitoring, support and guidance or both.

2.4 VC Reputation Measures

We carefully describe our six measures of VC reputation below. Our VC reputation measures are all based on information known prior to the event under analysis and are free of look-ahead bias. Data used to calculate VC reputation measures are taken from the Thomson Financial SDC VentureXpert and Global New Issues databases.

IPO Market Share

IPO Market Share equals a VC's dollar market share of its venture backed IPOs in the immediately preceding 3 calendar years. For instance, to analyze the long-run performance of an IPO completed in 1996, we first aggregate the dollar value of all IPOs backed by a VC during years 1993, 1994, and 1995 as a proportion of the total dollar size of all venture backed IPOs in the same 3 year period. Following Ritter (1984) and Megginson and Weiss (1991), we define the dollar size of an IPO as its gross proceeds, exclusive of over-allotment options.

IPO Investments as a Proportion of a VC's Total Investments

Our second measure of VC reputation also reflects the fact that IPOs are the most profitable VC exit, often yielding returns in excess of 50%. To calculate the proportion of a VC's total investment taking this highly profitable exit, we divide a VC's investments in IPO issuers in the 3 calendar years prior to the IPO in question, relative to the VC's total investments over this period (averaged over the start and end of the 3 years), which we term *IPO %*.

IPO Frequency in a VC's Venture Investment Portfolio

Our third measure of VC reputation is the frequency of IPOs in a VC's investment portfolio. *IPO Frequency* is calculated as the number of completed IPOs a VC backed in the prior 3 calendar years, relative to the number of companies in its active investment portfolio (averaged

over the beginning and end of the 3 years). This measure has the advantage of not being overly influenced by a few very large IPOs.

Both *IPO %* and *IPO Frequency* are defined relative to a VC's own venture investment portfolio, while *IPO Market Share* is defined relative to the total IPO activity of all VCs. So the former two measures are not biased against VCs with a small number of total venture investments, such as boutique VCs that voluntarily limit their investment activity to specific industries or technologies or a limited number of portfolio firms, while the latter measure gives greater weight to large VCs that are more active in the VC marketplace.

VC Firm Age

Our fourth VC reputation measure is VC firm age computed from the date the VC firm incorporates to the IPO date, following Gompers (1996) and Lee and Wahal (2004). The longer a VC is operating, the greater its experience and expertise, and the less likely it has made a serious string of mistakes. Thus, the greater is the VC's age the more likely that it is a successful competitor with a strong reputation.

Capital under Management and Total Investment

Finally, we consider two additional VC reputation measures based on a VC's fund raising and investment management ability. Specifically, we use a VC's capital under management, termed *VC Capital*, and total investment in all its portfolio companies, termed *VC Total Investment,* which are both measured as of the year-end immediately prior to the IPO date. Capital under management is defined as the dollar amount invested or available for investment by a VC (fund raising). Total Investment is defined as the dollar amount of venture financing (disbursements) received by portfolio companies from a VC.

2.5 Control Variables

Since we are interested in the marginal effect of VC reputation on future firm performance, we control for the effects of other issue characteristics on an issuer's long-run performance as described below. One of the most common issue characteristics in earlier IPO studies is the natural logarithm of IPO gross proceeds (*Ln Size*). It is typically argued that larger offers are generally made by more established and geographically diversified firms, which are more apt to be less risky [see Carter, Dark and Singh (1998)]. These data are taken from the SDC New Issues database. Likewise issuer age is suggested to proxy for lower issuer risk [for example, Ritter (1984)]. It is argued that because older firms have more tangible assets or collateral, a more developed management team and longer standing customer relationships, they are better

able to withstand adverse economic shocks, making them less risky. Issuer age at the IPO is measured relative to the firm's first incorporation date. This data is taken from Jay Ritter's web site. We measure issuer age as the natural logarithm of one plus issuer age (*Ln Age*).

The recent IPO literature has examined technology intensive firms separately because of the high level of technological risk and high level of expected growth [for example, see Loughran and Ritter (2004)]. We include a *Tech* indicator (defined in Appendix A) as a control variable to capture technology intensive industry characteristics. As a robustness check, we control for the 8 industry groupings of Gompers, Kovner, Lerner, and Scharfstein (2006) that capture VC expertise. As newer entrants in the VC industry, commercial banks are likely to be less experienced and also more willing to take greater risk. To account for this possibility, we include a *Bank-VC* indicator variable, which takes a value of one if any of the VC investors backing an IPO is a commercial bank, and is otherwise zero. This variable is based on data taken from SDC. We include year fixed effects in our panel regressions to control for differences across years. For instance, Ljungqvist and Wilhelm (2003) reports that IPOs completed in the 1999-2000 "bubble" period have unusual issue characteristics. We control for the cash and marketable securities balances scaled by total assets as a proxy to control for the empire-building incentives, or alternatively funding constraints, that can affect the post-issue performance of the IPO issuer firm.

Previous studies find that lead underwriter reputation significantly affects initial and long-run IPO returns [see, for example, Carter and Manaster (1990) and Carter, Dark and Singh (1998)]. We measure the underwriter's reputation by its Carter-Manaster ranking, *Underwriter Reputation*, as updated on Jay Ritter's web site: *http://bear.cba.ufl.edu/ritter/rank.xls.* Finally, since several studies beginning with Megginson and Weiss (1991) find that VC-backed firms have subsequent strong performance, which differs from that of non VC-backed firms, we include an indicator variable that is equal to one for VC-backing and is zero otherwise. By including a VC-backing indicator, we require our VC reputation measures to capture more than the effect of VC investors being present. These control variables are fully described in Appendix A.

2.6 Private Equity Networks and IPO Characteristics

To examine VC networking capabilities and the quality of IPO issuers VCs bring to the IPO market, we collect information on the number of VC co-investors in the IPO issuer at the time of the IPO as well as the legal advisors and accountants associated with the IPO issuers at the time of the IPO, the length of the registration period from filing date to IPO, and three indicators for IPO demand: (a) whether the offer price is higher than the midpoint of the initial filing range and (b) whether the IPOs are made in the Helwege and Liang (2004) hot issue

market periods, and (c) the number of primary shares sold relative to pre-IPO shares outstanding. All these data are taken from SDC Global New Issues database.

2.7 Corporate Governance Data

To examine the issue of VC monitoring and support of portfolio firms, we collect information on the corporate governance features of VC-backed IPO issuers. The corporate governance features we investigate are: VC shareholdings, VC directorships, founder-CEOs, the existence of staggered boards and dual CEO-board chairmanships. The data are taken from IPO prospectuses (for the year of the offering) and from annual proxy statements for each of the three years following the IPO. If proxy statements are not available, we use information from the firms' annual reports (10Ks). Prospectuses and proxy statements after May 1996 come from SEC's Edgar website (http://www.sec.gov/edgar.shtml). Prospectuses and proxy statements prior to May 1996 come from Thomson Financial's Disclosure database.

2.8 Acquisitions Data

To examine the relation between VC reputation and acquisitions of IPO issuers in the post-IPO period, we collect acquisitions data on VC-backed IPO issuers acquired within the 3 years of the IPO month from the SDC Mergers and Acquisitions database. We exclude acquisitions withdrawn or missing a definite effective date. Target takeover premium data also comes from this database, and is defined as the ratio of the target share purchase price divided by its closing stock price one day before the offer announcement minus one. Alternatively, we define the target premium as the purchase price relative to the closing stock price 1 week, or 4 weeks before the offer announcement. Further, since transaction features such as (a) transaction value, (b) the percentage of the shares acquired in the transaction, (c) whether the acquisition deal is a pure cash transaction, and (d) multiple bidders can all affect the target premium paid, we collect data on these deal-related control variables as well.

2.9 Sample Descriptive Statistics

Table 1A shows the yearly frequencies of non-VC-backed and VC-backed IPOs. Our sample consists of U.S. IPOs completed in the 1993-2004 sample period. Our primary analysis is over the ten year 1993-2002 period, where we have 1200 IPOs backed by 1519 separate VCs and 1302 IPOs without VC backing. Of the sample of VC-backed IPOs, 17% were backed by a single VC, 13% by a syndicate of 2 VCs, 13% by 3 VCs, 10% by 4 VCs, 9% by 5 VCs, 25% by a syndicate of 6 to 10 VCs and the remaining 13% of the IPOs by a syndicate of more than 10 VCs. We have 378 VC-backed IPOs in the 1993-1995 sample period, which we use to calculate the initial VC

reputation measures. We have 303 VC-backed IPOs in the 2003-2004 sample period, which we use to examine the relation between VC reputation measures and future VC-backed IPO frequency. [12] We analyze the effect of VC reputation on the long-run performance of 2019 IPOs issued in the 1996-2002 period, of which 822 are VC-backed IPOs. While CRSP data is available for the *Listed* performance measure for our entire IPO sample, we have Compustat-based *ROA* and *M/B* variables for only 787 VC-backed IPOs and 1154 non-VC-backed IPOs. We have R&D expense and the capital expenditure figures needed to compute our ex-ante growth measures for 560 VC-backed IPOs and 837 non-VC-backed IPOs.

Table 1B compares the characteristics of non-VC-backed IPOs with those of the VC-backed IPOs completed in the 1996-2002 sample period. Consistent with Gompers and Lerner (2000) and Lee and Wahal (2004), VC-backed IPO issuers tend to be younger and include a higher frequency of issuers in technology intensive industries than non-VC-backed issuers. Also, consistent with Lee and Wahal (2004), IPOs with venture backing are typically underwritten by more prestigious investment banks than non-VC-backed IPOs.

Table 1C reports the descriptive statistics for long-run performance measures of non-VC-backed and VC-backed IPOs. All three of our long-run performance measures, namely *ROA*, *M/B,* and *Listed,* as well as our two forward looking growth measures, the ratio of research and development expenditures (R&D) to capital expenditures, and the ratio of R&D expenses and capital expenditures to total assets, show that long-run performance is significantly higher for VC-backed IPOs than for non VC-backed IPOs. This is consistent with a number of earlier studies of VC-backing [see, for example, Brav and Gompers (1997)].

Table 2A presents descriptive statistics for our alternative VC reputation measures, while Table 2B reports their pair-wise correlations. The means and medians for each of these VC reputation measures are close to each other, except for *VC Capital* and *VC Total Investment*, suggesting that outliers are not a serious concern for our first four reputation measures. The two VC size measures, *VC Capital* and *VC Total Investment*, show strong skewness across the IPO sample, which is to be expected given the sample includes a small number of relatively large VCs, along with many small and medium size VCs. We examine the correlations among VC reputation measures after grouping them into closely related categories to create two groups of reputation measures. The composition of the two groups of reputation measures are as follows - Group 1: *IPO %* and *IPO Frequency*, and Group 2: *VC Capital* and *VC Total Investment*. The within group correlations are statistically significant, which is to be expected

[12] We find 1541 VC-backed IPOs over 1993-2004 in the SDC database. As comparisons, Loughran and Ritter (2004) study 1391 VC-backed IPOs over 1990-1998, and 487 VC-backed IPOs in 1999-2000, and Ljungqvist (1999) study 513 VC-backed IPOs in the 1996-1998 period.

given the grouping objective. In addition, the correlation between *IPO Market Share* and *VC Total Investment* is positive and highly significant, which is also not surprising considering that the larger is a VC's aggregate investment in portfolio companies, the more likely it is to have a large IPO market share. Interestingly, the inter-group correlations of these VC reputation measures are distinctly different from each other, with correlations below 0.40.

2.10 VC Reputation and Characteristics of Firms brought to IPO Market

To learn more about the characteristics of the firms brought to the IPO market, we examine the cross-sectional differences in the characteristics of IPO firms backed by VCs of different reputations. Table 3 presents the coefficient estimates and associated *t*-statistics that are based on heteroskedasticity-consistent standard errors for each of our six measures of *VC Reputation* regressed against our control variables, as shown below:

$$(1) \quad VC\ Reputation = \beta_0 + \beta_1\ Underwriter\ Reputation + \beta_2\ Ln\ Asset + \beta_3\ Ln\ Size + \beta_4\ Ln\ Age + \beta_5\ Tech + \varepsilon,$$

where β_0 is a vector of year fixed effects, and *Ln Asset*, represents the natural log of the issuer's total assets at the end of the quarter immediately prior to the IPO date. Tobit regressions are used because all the dependant variables are censored at zero. In Table 3A, the VC syndicate reputation measure, averaged over all VCs associated with an IPO is used as the dependent variable. In Table 3B, the lead VC's reputation is used as the dependent variable.

Table 3 shows that IPO issuers backed by higher ranked VCs tend to be smaller (as measured by asset size), and are more frequently in *Tech* industries than IPO issuers backed by lower ranked VCs or having no VC backing. There is also strong evidence that IPOs backed by higher ranked VC-backed are also backed by higher ranked lead underwriters than IPOs backed by lower ranked VCs or having no VC backing. This hints at better networking capabilities of more reputable VCs, which we will examine in greater detail later. The above evidence highlights the importance of controlling for issuer characteristics in our analysis of post-IPO performance.

3. Evidence on Long-run IPO Issuer Performance

In this section, we assess the power of alternative VC reputation measures to explain post-IPO long run performance. Our objective is to determine if one reputation measure is significantly better than the others in terms of explaining superior VC performance.

3.1. VC Reputation and Issuer Long-run Industry Adjusted ROA

We predict that post-IPO earnings performance will be higher when an issuer is backed by a more reputable VC. To test this prediction, we use the following regression specification for industry-adjusted ROA:

(2) $ROA = \beta_0 + \beta_1 \, VC\ Reputation + \varepsilon.$

We begin by sequentially estimating equation (2) using each of our six VC reputation measures as the sole regressor: namely, *IPO Market Share, IPO %*, *IPO Frequency*, *VC Age, VC Capital*, and *VC Total Investment*. We find that all six VC reputation measures have significant positive effects on industry-adjusted ROA of the IPO issuers that they backed, regardless of whether we use VC syndicate or VC lead reputation. Of course, this result may be due to other issue characteristics varying across the VC reputation samples. To address this concern, we add controls for the following issue characteristics in our regression analysis: *Ln Size* and *Ln Age* represent the natural logarithms of the IPO's dollar issue size and issuer age respectively, and *Tech*, *Bank-VC* and *VC-backed* represent indicator variables for issuers in technology industries, commercial bank VCs and VC-backed issuers respectively. The pair-wise correlations among the control variables – *Ln Size, Ln Age,* and *Tech* – are generally very low, all being less than 10%. We also include year fixed effects in the panel regressions to control for differences in economic conditions across time. The expanded regression specification is:

(3) $ROA = \boldsymbol{\beta_0} + \beta_1 \, VC\ Reputation + \beta_2 \, VC\text{-}backed + \beta_3 \, Underwriter\ Reputation + \beta_4 \, Bank\text{-}VC + \beta_5 \, Ln\ Size + \beta_6 \, Ln\ Age + \beta_7 \, Tech + \varepsilon,$

where $\boldsymbol{\beta_0}$ is a vector of year fixed effects.

To assess the relative explanatory power of our alternative VC reputation measures, the *ROA* regression results reported in Table 4 differ only in terms of the VC reputation measure used as a regressor. The regression equation (3) also includes a VC-backing indicator, which is the standard VC control variable used in most of the extant IPO literature. This allows us to estimate the incremental explanatory power of our VC reputation measures over and above the existence of VC backing. The regression model also includes the lead underwriter's reputation measure, *Underwriter Reputation*, to distinguish its effect on issuer performance from that of VC reputation. The correlations of all VC reputation measures with lead underwriter reputation, *Underwriter Reputation*, are very low. This provides some comfort that the explanatory power of

VC reputation measures in the long-run IPO issue performance regressions is not the result of them acting as close proxies for lead underwriter reputation.

In Table 4A, VC syndicate reputation (averaged over all VCs associated with an IPO) is the key explanatory variable. In Table 4B, lead VC reputation is the key explanatory variable. Tables 4A and B present coefficient estimates and associated *t*-statistics based on standard errors which are robust to heteroskedasticity and industry clustering (*t*-statistics are in parentheses).[13] The table shows that IPO issuers backed by more reputable VCs have better long-run operating performance. All six VC reputation measures have significant positive effects on long-run *ROA*, although the explanatory power of *VC Age* is noticeably lower than that other VC reputation measures in Table 4A and the explanatory power of *VC Total Investment* is noticeably lower than that of other lead VC reputation measures in Table 4B. At the same time, the VC indicator variable is statistically insignificant in the presence of any of these VC reputation measures, which indicates that controlling for VC reputation is more informative than simply controlling for the existence of one or more VC investors, as most of the extant literature does. This evidence indicates that our VC reputation measures have significant explanatory power for the long-run operating performance of IPO issuers.

The cash available to a firm can influence its operating performance, and especially its *ROA*. If the firm has large cash holdings, it may be tempted to invest in less profitable projects to accommodate CEO empire-building incentives. On the other hand, if a firm is financially constrained, its wasteful expenditures are curtailed, but it may be unable to undertake all its profitable investment opportunities. Either way, *ROA* could be affected by firm cash balances. If VC reputation is correlated with issuer cash balances, then our earlier results may be a result of an omitted variable problem. To test this alternative hypothesis, we follow Opler, Pinkowitz, Stulz, and Williamson (1999) and Almeida, Campello, and Weisbach (2004) by defining *Cash Ratio* as the average yearly ratio of cash and marketable securities to total assets. We then add this as an additional control variable into equation (3) and find that our results qualitatively unchanged, and the regression coefficient on *Cash Ratio* is insignificant. That is to say, all VC reputation measures continue to have significant positive effects on issuer long-run *ROA*. Replacing *Cash Ratio* with a broader liquidity measure, *Liquid Assets Ratio*, defined as the average yearly ratio of current assets minus current liabilities deflated by total assets, does not change our conclusions. These results are untabulated, but available upon request. It should come as no surprise that financial constraints are not statistically significant for our sample

[13] In regressions of post-IPO issuer performance on VC reputation, the explanatory variables and residuals can be industry dependent, in which case White standard errors can be biased, while heteroskedasticity robust standard errors with industry-clustering are well-specified [see Petersen (2006)].

given that VC-backed IPO issuers are young, high-growth firms, which need large amounts of external capital to thrive or, indeed, to survive. While there may be differences in the degree to which individual firms need new capital infusions, it is also likely that nearly all of these firms are experiencing serious financial constraints relative to the population of listed firms. Thus, while our sample firms are experiencing financial constraints, this does not help explain the superior operating performance of IPO issuers backed by more reputable VCs.

Turning to the other control variables, we see that older, more established issuers and more reputable underwriters are associated with issuers having superior industry-adjusted ROA, while commercial bank VCs are associated with poorer long-run operating performance, consistent with banks, as new entrants in the VC market, being willing to take greater risk to capture market share.

3.2 VC Reputation and Issuer Long-run Market-to-Book Ratio

Table 5 shows the coefficient estimates and associated *t*-statistics (which are robust to heteroskedasticity and industry clustering) for market-to-book regressions that include one of our alternative VC reputation measures, along with a *VC-backing* indicator and a set of control variables representing the issue characteristics used in Table 4. In Table 5A, the VC syndicate reputation measure, averaged over all VCs associated with an IPO, is used as the independent variable. In Table 5B, the lead VC reputation measure is used as the independent variable.

When the VC syndicate reputation measures are examined (Table 5A), *IPO Market Share* and *IPO Frequency* are the only VC reputation measures that have significant positive relationships with issuer market to book ratio. When lead VC reputation measures are examined (Table 5B), only *IPO Market Share* and *VC Total Investment* have significant positive relationships with issuer long-run market to book ratio. Weak results pertaining to other VC reputation measures suggest that only one or two of our alternative VC reputation measures are significant on a consistent basis in regressions explaining future post-IPO long-run performance. The VC-backing indicator also has a significant positive association with the long run market-to-book ratio. This result may reflect from the fact that four of our six VC reputation measures have no power to predict post-IPO market-to-book ratios, while VC-backed firms tend to have better performance than non VC-backed firms.[14] Turning to the control variables, larger IPOs are associated with significantly smaller long-run market-to-book ratios in Table 5A, and

[14] As with ROA, we estimate a simple regression with one of the six alternative VC reputation measures on long-run M/B. All the reputation measures have significant positive effects on issuer long-run M/B ratios, whether we use the average VC reputation measure or the lead VC reputation measure as the independent variable. We find that the explanatory power of *IPO Market Share* is noticeably higher than other VC reputation measures.

commercial bank VC-backed IPOs are associated with significantly smaller long-run market-to-book ratios in Table 5B.

3.3 VC Reputation and Issuer Long-run Listing Survival

Our third measure of IPO long-run performance is issuer listing survival 36 months after the IPO month. We use an indicator variable, *Listed*, that takes a value of 1 for firms that survive at least 3 years after the IPO month, and 0 for firms that liquidate, declare bankruptcy, become defunct or are otherwise dropped from the CRSP database due to financial distress within 36 months of the IPO month.[15] Since the dependent variable is a qualitative binary variable, we analyze this relationship using a logit model. Table 6 presents the coefficient estimates and associated *z*-statistics (corrected for heteroskedasticity and industry clustering) for logit regressions that include one of our alternative VC reputation measures, along with a *VC-backing* indicator and the issue characteristics used in Tables 4 and 5 as control variables. In Table 6A, VC syndicate reputation is used as the independent variable. In Table 6B, the lead VC reputation is used as the key explanatory variable.

Examining VC syndicate reputation measures, three measures, *IPO Market Share*, *IPO %* and *VC Age*, show significant positive associations with long-run listing survival (Table 6A). Examining lead VC reputation measures, two more VC reputation measures, *VC Capital* and *VC Total Investment*, also have significant associations with long-run listing survival (Table 6B). Estimates of the control variables in Table 6 also show that listing survival rises for older issuers and issues underwritten by more reputable investment bankers, while it falls for IPOs backed by commercial bank-VCs.[16] In untabulated results, we find that when we estimate a logit model using only an intercept and one of our six VC reputation measures, all of the reputation measures have a significant positive effect on listing survival, except *IPO Frequency*, regardless of whether we use VC syndicate or lead VC reputation as the independent variable.

From the results of tables 4-6, *IPO Market Share* is the only VC reputation measure that is strongly and consistently related to future post-IPO issuer performance and that this measure dominates the other measures previously used in the VC literature, such as VC firm *Age*.

3.4 Summary of Findings

To summarize, the evidence in Tables 4-6 shows that *IPO Market Share* has significant explanatory power in all the regressions across the three IPO long-run performance measures,

[15] Acquisitions and mergers are excluded as generally not due to financial distress, but are separately examined later.
[16] Hellmann, Lindsey and Puri (2007) suggest banks are strategic VC investors who care more about building future lending relationships than having successful IPOs and exhibit investment patterns distinct from traditional VCs.

while the other VC reputation measures are sometimes significant. Weaker results obtained from the other VC reputation measures highlights the strength of *IPO Market Share* as a VC reputation measure. To measure the economic significance of *IPO Market Share* (with the VC syndicate's average or *composite* reputation measure), we take a one standard deviation change in a VC's *IPO Market Share* and find that it is associated with a 31% change in *ROA* and a 15% change in *M/B,* controlling for the other issue characteristics. A one standard deviation increase in a VC's *IPO Market Share* also raises the odds of listing survival by a factor of 1.45, after controlling for other issue characteristics. Thus, *IPO Market Share's* association with post-IPO issuer performance has clear economic significance.

We also find that *IPO Market Share* has a stronger association with issuer long-term performance measures, when we focus on lead VC reputation, rather than the VC syndicate's composite reputation measure. As a further check of the usefulness of our VC syndicate reputation measures, we add an interaction term between our VC syndicate reputation measure and an indicator for VC syndicates with less than 4 members. If our VC syndicate reputation measure is more reliable for smaller VC syndicates, then we should expect the interaction term's coefficient to be positive and statistically significant. However, the interaction term is statistically insignificant, which supports the reliability of our current VC syndicate reputation measure in predicting the long-term success of portfolio firms that go public.

It is important to recognize that Tables 4-6 examine different dimensions of firm long-run performance: average profitability, future growth potential, and the likelihood of serious financial distress. Thus, the significance of different control variables across these tables should not be surprising. However, it is reassuring that when the control variables are statistically significant, they have consistent signs. For example, underwriter reputation is significantly and positively associated with long-run *ROA* and *Listed*, while *Bank-VC* variable is significantly and negatively associated with the same two long-run performance measures. The exception is issuer age, which is significantly and positively associated with *ROA* and *Listed*, but negatively associated with *M/B*. However, this result makes sense since older firms have more stable operations, which are associated with higher profitability and higher likelihood of remaining listed on a major stock exchange than younger firms. On the other hand, older firms are likely to have lower growth potential, which is reflected in a smaller market to book ratio.

We considered a number of other control variables in the regression specifications examined in Tables 4-6 including *Ln Asset*, indicator variables for Nasdaq listing, the 1999-2000 "bubble period" (in place of year fixed effects), and when a VC investor is also a lead underwriter of the IPO issuer. The results remain qualitatively unchanged with the inclusion of any of these added control variables. Recall that we controlled for survivorship bias in our *ROA*

and *M/B* measures of post-IPO long run performance by including observations that occur less than 3 years after the IPO month due to early delisting. If we alternatively only analyze issuers that remain listed for the first 3 calendar years following the IPO month, we find that *IPO Market Share* continues to be positively related and statistically significant (at the 1% level) for the *ROA* and *M/B* long term performance measures.

Next we examined the relations between our VC reputation measures and post-IPO 3-year cumulative abnormal stock return using Fama-French calendar time regressions. We find that *IPO Market Share* has a significantly positive association with issuer long-run abnormal stock returns. This conclusion is robust to adding a liquidity factor to the statistical model and the use of factors purged of recent equity issuers [see Loughran and Ritter (2000)]. We interpret it as further evidence that more reputable VCs invest in better performing firms.

Finally, we examine which VC firms are highly ranked using our "best" VC reputation measure, *IPO Market Share*. The 25 top VCs based on *IPO Market Share* averaged over the 1996-2002 period are listed in Appendix B. We find the top ranked VCs are J.P. Morgan Partners, Kleiner Perkins, New Enterprises Associates, Sequoia Capital, and Integral Capital Partners. These VC firms frequently have annual IPO market shares over 1% over the sample period in VC-backed deals. In total, 28 VC firms have average market shares in VC-backed IPOs in excess of 0.5%. VC firms with high *IPO Market Shares* rankings are also often in industry lists of top ranked VC firms, such as the top 100 Early Stage VCs list published by *Entrepreneur* magazine and the 100 top VCs list published by *Forbes* magazine. Thus, many of the most reputable VCs, based on our best VC reputation measure, are also highly ranked by VC industry publications.

4. Robustness Checks

The *IPO Market Share* VC reputation measure is consistently positively associated with all our IPO issuer long-run performance measures. The explanatory power of this VC reputation measure is also significantly higher than that of a simple VC-backing indicator variable, which is often used in the security offering literature as a control variable for VC involvement. To assess the strength of this finding, we subject it to extensive sensitivity analysis.

4.1 Correcting for VC Self-Selection

The coefficient estimates in previous tables could also reflect a self-selection effect if more reputable VCs have better access to most promising business ventures, as argued in Lee and Wahal (2004) and Sorensen (2007). Thus, a VC's association with superior issuer performance may be due to the quality of the ventures in which it is able to invest, rather than its ability to support its portfolio firms.

We believe that issuer asset size, the number of VC co-investors, and revision of offer price are good instrumental variables (IVs) for capturing this potential self-selection effect, because we find that they are correlated with underlying firm quality at the IPO date, but are unrelated to post-IPO long-run performance. Yet, in any analysis of post-issue performance, we must recognize the difficulty in fully controlling for the selection of better quality venture investment opportunities by more reputable VCs. However, given that our primary objective is to show that more reputable VCs have stronger associations with both future IPOs and post-IPO success than other VCs, controlling for VC selectivity is not essential. Nonetheless, to provide evidence on VC support and development of their portfolio firms is an important cause for their superior long run performance, we take several steps to control for the VC selection or screening effect.

We use a variation on Heckman's (1979) correction method to capture the VC screening process. In the first step of the Heckman two-step procedure, the likelihood of a positive outcome for the dependent variable, which in our case is a more reputable VC investor, is estimated using a logit regression. Parameter estimates from this model are used to calculate the inverse Mills' ratio for VC reputation, which is then included as an additional explanatory variable in the second step regression model, along with VC reputation itself. The inverse Mills' ratio captures the probability that more reputable VCs select better quality portfolio firms, thereby accounting for the self-selection effect that VC reputation would otherwise capture.

Table 3 indicates that IPO issue characteristics vary by VC reputation. Taking these results into account, we include issue size, issuer age and whether the issuer is a *Tech* firm as well as issuer size, measured by *Ln Asset*, in our first stage logit model of VC selection. Further, we exclude issuer size from the second stage issuer long term performance regressions.[17]

$$(4) \qquad VC\ Rank_i^* = \alpha_{i0} + \alpha_{i1}\, Ln\ Asset + \alpha_{i2}\, Ln\ Size + \alpha_{i3}\, Ln\ Age + \alpha_{i43}\, Tech + \varepsilon_i$$

$$VC\ Rank_i = \begin{cases} VC\ Rank_i^* & \text{for venture- backed IPOs} \\ 0 & \text{for non VC-backed IPOs,} \end{cases}$$

where *VC Rank** is a latent variable observed only for VC-backed IPOs and *VC Rank* is an indicator variable that takes a value of one for higher ranked VCs, defined as VCs with *IPO Market Share* greater than the median market share and is zero otherwise. In Table 7A, we use the VC syndicate reputation measure, while in Table 7B, we use the lead VC reputation measure as the key explanatory variable. Given the above model, we estimate the following logit regression in the first stage of the two-step Heckman procedure:

[17] *Ln Asset* is statistically significant in the first-stage regressions, but insignificant in the second-stage regressions, making it a valid IV.

$$VC\ Rank = \alpha_0 + \alpha_1 Ln\ Asset + \alpha_2 Ln\ Size + \alpha_3 Ln\ Age + \alpha_4 Tech + \varepsilon,$$

The inverse Mills' ratio is calculated from the above logit regression and used in the following second stage regression:

(5) $$P = \beta_0 + \beta_1 IPO\ Market\ Share + \beta_2 VC\text{-}backed + \beta_3 Underwriter\ Reputation + \beta_4 Bank\text{-}VC + \beta_5 Ln\ Size + \beta_6 Ln\ Age + \beta_7 Tech + \beta_8 Inverse\ Mills + \nu,$$

where β_0 is the vector of year fixed effects and issuer performance, *P*, alternatively represents *ROA*, *M/B*, or *Listed*. The *t*-statistics (or *z*-statistics in the case of the *Listed* logit regressions) are based on standard errors that are robust to heteroskedasticity and industry clustering.

Tables 7A and 7B show that the first stage prediction model has reasonable explanatory power. The second stage regressions indicate the importance of VC selectivity since for all 3 firm performance measures the inverse Mills' ratio is statistically significant. However, after controlling for VC selectivity and major issue characteristics, *IPO Market Share* remains significant and is positively related to all three IPO long-run performance measures. Comparing the results for VC syndicate and lead VC reputation, we find *IPO Market Share* has a positive statistically significant association with post-IPO long-run performance using either variant of *IPO Market Share*, though lead VC reputation tends to have larger statistical significance. Thus, more reputable VCs are associated with superior post-IPO long-run performance, after taking venture investment selectivity into account, indicating that VC monitoring, networking and development skills create value for their portfolio firms.

4.2 Alternative Specifications for Correcting for Selection Bias

We reexamine our results using alternative IVs in the first stage of the Heckman procedure above. Two alternative IVs for VC reputation are considered (1) VC syndicate size at the IPO, *VC Syndicate Size*, since more reputable VCs can attract more co-investors [Hochberg, Ljungqvist and Lu (2007a)] and (2) the percentage revision in the IPO offer price relative to the midpoint of the initial filing range, *Revision*, since a larger positive revision reflects greater IPO investor demand, which more reputable VC involvement should encourage [Hanley (1993)]. Clearly, both *VC Syndicate Size* and *Revision* are correlated with VC reputation; indeed, we empirically show that this is the case in Section 6. However, there is no reason to believe that number of pre-IPO co-investors or offer price revision should affect post-issue long-run operating performance; indeed we find that they are not significantly related to long-run post-

IPO performance after controlling for other variables. Hence, both *VC Syndicate Size* and *Revision* are potential alternative first-stage IVs, which can help control for VC selectivity. We replace *Ln Asset* with *VC Syndicate Size* or alternatively with *Revision*, and find that our results are qualitatively unchanged. Both VC syndicate and lead VC *IPO Market Share* have significant positive associations with all three measures of long-run issuer performance.

It is possible that by transforming the continuous *IPO Market Share* variable into a binary variable, *VC Rank,* in the first stage regression, we lose some valuable information about VC reputation, though this specification better accommodate non-linear relations. As Appendix B shows, the top VC has an average market share of just over 2% and that there is no clustering of market shares.[18] Therefore, as a robustness check, we estimate a simultaneous equations model using two-stage least squares procedure with *IPO Market Share* replacing *VC Rank* in the first stage VC selection equation. We initially use *Ln Asset* as a first-stage IV. Both VC syndicate and VC lead *IPO Market Share* continue to have significant positive associations with all three measures of post-issue long-run performance in the second-stage regressions. The second-stage regression estimates using lead *IPO Market Share* as the key explanatory variable are shown in Panel C of Table 7. We then replace *Ln Asset* as an IV with *VC Syndicate Size* and, then alternatively, with *Revision*. Again, we find both VC syndicate and lead *IPO Market Share* continue to have significant positive associations with all three measures of post-issue long-run performance.[19] Thus, more reputable VCs are associated with superior issuer long-run performance, even after taking into account their selectivity in making venture investments, which supports more reputable VCs offering more valuable advisory and monitoring services. We further test this conclusion in the last sections of the study where we focus on post-IPO VC involvement, issuer corporate governance, and VC private equity networks.

4.3 VC-backed IPO Sample

Thus far, we have examined the full sample of VC-backed and non-VC-backed IPOs to evaluate our alternative VC reputation measures. However, as Table 1 highlights, the VC-backed IPO sample has different characteristics from the non-VC-backed sample. Thus, it may be prudent to restrict our analysis to the IPO sample with VC backing and then re-evaluate whether our VC reputation measures continue to have significant explanatory power in regressions of IPO issuer long-run performance. This could be especially useful if the control variables affect the non VC-backed sample differently from the VC-backed sample.

[18] In contrast, treating lead underwriter IPO market share as a binary variable is more justifiable since in the late 1990's, the top 10 investment banks controlled around 90% of the lead-underwriter business in the IPO market (based on Thomson Financial's investment banking league tables).

[19] These results are not tabulated, but are available from the authors upon request.

Table 8 reports the estimates when our strongest VC reputation measure, *IPO Market Share,* along with the prior control variables for issue characteristics are regressed on each of the 3 primary measures of post-IPO performance, namely *ROA, M/B,* and *Listed*:

$$(6) \qquad P = \beta_0 + \beta_1 \, IPO\ Market\ Share + \beta_2 \, Underwriter\ Reputation + \beta_3 \, Bank\text{-}VC + \beta_4 \, Ln\ Size + \beta_5 \, Ln\ Age + \beta_6 \, Tech + \varepsilon.$$

In Table 8A, the VC syndicate reputation measure is used as the independent variable, and in Table 8B, the lead VC reputation measure is used as the independent variable. Tables 8A and 8B show that *IPO Market Share* continues to have significant explanatory power in all the regressions using alternative measures of issuer long-run performance, where we restrict ourselves to the VC-backed IPO sample. When we repeat this analysis in untabulated results for the other five competing VC reputation measures, we find that none of these competing reputation measures are consistently significant across all the post-IPO performance measures. In fact, we find that only *IPO %*, *VC Capital*, and *VC Total Investment* are significant for more than one of these long-run performance measures.

4.4 Controlling for Hot and Cold IPO Markets

Helwege and Liang (2004) examine industry clustering and differences in operating performance between firms going public in "hot" and "cold" IPO periods. They identify hot and cold IPO periods based on aggregate monthly issue volume, following the work of Bayless and Chaplinsky (1996) and Lowry and Schwert (2002). They use 3-month centered moving averages of the number of IPOs in each month to make this classification. Using a moving average avoids classifying seasonally low months as cold when they are in the middle of a "neutral" period. Periods with 3 consecutive months where a moving average exceeds 33 IPOs (the top quartile of monthly moving averages) are defined as hot IPO issue months. Periods with 10 or fewer IPOs (the bottom tercile of monthly moving averages) for 3 consecutive months are defined as cold IPO issue months. They observe that 2001-2002 is among the coldest IPO periods since 1960, averaging only 6 IPOs per month.

We replace the year fixed effects with *Hot* and *Cold* IPO market indicators using the Helwege and Liang classification, and re-estimate our regression analysis. We find that *IPO Market Share* continues to have significant explanatory power for all 3 long-run performance measures, *ROA*, *M/B*, and *Listed*. The fact that *IPO Market Share* continues to have significant explanatory power, after controlling for hot and cold IPO markets, shows that the explanatory power of this VC reputation measure is robust to various IPO market conditions.

4.5 Controlling for Different Industries and Examining Sample Sub-periods

Post-IPO long-run performance can be affected by an issuer's industry. VCs generally specialize in particular industries, which need not be technology intensive industries. In this section, we replace a high tech indicator, *Tech*, with a vector of 8 indicator variables for industries having similarities in technology and management expertise, which VCs specialize in. Following Gompers, Kovner, Lerner, and Scharfstein (2006), the industry groups are defined as (a) Internet and Computers, (b) Communications and Electronics, (c) Business and Industrial, (d) Consumer Products, (e) Energy, (f) Biotech and Healthcare, (g) Financial Services, and (h) Business Services. We find that *IPO Market Share* continues to have significant explanatory power for all 3 long-run performance measures, *ROA*, *M/B*, and *Listed*. Thus, the explanatory power of this VC reputation measure is robust to controlling for industry characteristics that could affect long-run firm performance.

We next segregate the IPO sample into two segments: IPOs issued in 1996-1999 and those issued in 2000-2002, and examine whether the *IPO Market Share* VC reputation measure continues to have significant explanatory power over all 3 long-run performance measures for both time periods. The first period ends with the tech bubble. The second period captures the recession that follows the bubble period. While the *IPO Market Share* continues to have significant explanatory power for all 3 long-run performance measures in both sub-intervals, it is has a stronger association with the post-issue long-run performance measures *ROA*, and *M/B* in the later period, and with *Listed* in the first period.

4.6 Examining Alternative Definitions of IPO Market Share

As a robustness check, we measure *IPO Market Share* using two alternative definitions. First, we measure *IPO Market Share* as the market share of a VC based on the frequency of IPO deals that the VC backed relative to all VC-backed IPOs in the same period, rather than the relative dollar value of deals the VC backed. This alternative definition limits the influence of particularly large IPOs in estimating VC reputation. Second, we measure *IPO Market Share* as the dollar market share of IPOs that the VC backed between 1993 and the year prior to the IPO year. This measure estimates VC syndicate reputation by using the entire history of VC activity up to the IPO year and treats all the observations as equally relevant.

When we estimate the primary regression models in Tables 4-6 based on our two alternative IPO market share definitions, we find in untabulated results that both variants of IPO market share have significant positive relationships with all 3 measures of long-run performance for later IPOs backed by the same VC. Comparing the explanatory power of these two alternative market share measures for issuer long-run performance measures, we find that neither of these

two variants of *IPO Market Share* has as much explanatory power across all long-run performance measures as our original *IPO Market Share*. Nevertheless, these results yield further evidence supporting the robustness of our earlier conclusions that *IPO Market Share* is the best measure of VC reputation based on our evidence.

5. Evidence on VC Support and Development of Portfolio Firms

5.1 VC Reputation and Post-Issue Growth Potential

Does superior monitoring and support by the more reputable VCs in the post-IPO period manifest itself in higher post-IPO growth potential of these portfolio firms? To address this question, we examine issuer expected growth rates, as in Gomper (1995) measured by (1) the ratios of research and development (R&D) expenses to capital expenditures and (2) R&D expenses plus capital expenditure to total assets ratio, measured over three years following the IPO month. Table 9 reports regression estimates when each of the two IPO issuer growth measures is regressed against the VC reputation measure, *IPO Market Share*, issuer size, other control variables used in prior analysis, plus the industry and year fixed effects. Industry indicators are based on industry groups identified by Gompers, Kovner, Lerner, and Scharfstein (2006) as capturing VC industry expertise. The estimated association of alternative VC syndicate's reputation measures with (1) R&D expenses to capital expenditures averaged over 3 year post-IPO period is in Table 9A and (2) R&D expenses plus capital expenditures to total assets averaged over 3 year post-IPO period is in Table 9B. Table 9C presents results when the lead VC *IPO Market Share* reputation measure is used as the key explanatory variable. Tobit regressions are used because the dependant variables are censored at zero.

Tables 9A, B and C show that *IPO Market Share* has a significant positive association with both measures of issuer expected growth, whether we use VC syndicate or lead reputation. *IPO %*, *IPO Frequency* and *VC Age* also have statistically significant associations (at the 1% level) with both measures of issuer expected growth. So firms backed by more reputable VCs continue to have significantly higher forecasted growth post-IPO, compared to firms backed by less reputable VC firms. This evidence suggests that more reputable VCs are better able to develop the potential of the firms they fund. Given these high growth firms are also more likely to have profitable investment opportunities, the above evidence suggests that these firms will continue to be more profitable well beyond the 3 year post-IPO period.

5.2 VC Reputation and Issuer Corporate Governance

Can the relation between VC reputation and the corporate governance characteristics of their portfolio companies partially explain the superior post-IPO performance of issuers backed by

more reputable VC firms? This is an especially interesting question since VCs typically have strong control rights before a firm goes public and VC investments and board participation can continue well beyond the IPO. Further, a number of theoretical studies argue that creditors with inside information can monitor a firm better and improve its corporate governance [see, for example, Bolton and Scharfstein (1996), and Holmstrom and Tirole (1997)]. A number of empirical studies show that superior corporate governance structures raise shareholder value, which in our analysis implies financial benefits to VC investors.

In our analysis, we examine five post-IPO issuer governance characteristics: (a) an indicator variable for VC shareholdings, (b) an indicator variable for VC director(s), (c) an indicator variable for when a CEO is also chairman of the board, (d) an indicator variable for a CEO who is a founder, and (e) an indicator variable for a staggered board. VC shareholdings and board directorships, which continue in the post-IPO period, both enable and motivate VCs to use their expertise to support the further development of their portfolio firms. Separation of the CEO and chairman roles strengthens board independence and increases board oversight of senior management. Similarly, a non-founder CEO is likely to be less entrenched and subject to greater board oversight. In contrast, a staggered board is an important anti-takeover provision [Bebchuk, Cohen, and Ferrell (2005)], which reduces the disciplinary threat to CEOs from the market for corporate control, thus raising agency costs. We observe these five corporate governance characteristics at the IPO date, as well as 1, 2 and 3 years thereafter. Corporate governance data are available for 813 VC-backed issuers at the IPO date, and 783, 690, and 590 VC-backed IPO issuers respectively 1, 2, and 3 years thereafter.

We first compare the frequency of five governance features in IPO issuers backed by lead VCs when ranked in the top and bottom quartiles by *IPO Market Share*. Panel A of Table 10 shows that more reputable lead VCs hold a significantly higher proportion of issuer shares and board seats in IPO issuers they back, not only at the IPO date, but also 1, 2, and 3 years after the IPO. More reputable lead VCs are also associated with firms having significantly lower proportion of founder-CEOs and CEO-chairmen in the IPO year as well as 1, 2, and 3 years after the IPO.[20] Although suggestive, these comparisons do not control for other issuer characteristics that can vary across IPOs. As a result, we estimate regressions of VC reputation and various controls on individual corporate governance features in the following analysis.

[20] By way of comparison, Ivanov and Masulis (2007) find 90% of their sample of 276 VC-backed IPOs made over the 1993-1999 period had VC shareholding, 89% had VC directors, 49% had dual CEO-chairman 1 year after IPO, and 41% had CEO-founders. All these figures are close to the figures we find. Pompilio (2007) reports 60% of his sample of 420 VC-backed IPOs made in the 1996-2006 period had dual CEO-Chairman positions at the IPO. Our sample period is slightly different and our sample of VC-backed IPOs is larger than that in ether of these studies.

Table 10B presents the regression estimates when each corporate governance measure of an issuer is individually regressed on syndicate or lead VC *IPO Market Share* and a set of control variables. As in the prior tables, we first examine the composite *IPO Market Share* for the VC syndicate and then use the corresponding measure for the lead VC, defined as the VC with the largest total investment in the firm at the IPO. The logit regression specification is:

$$(7) \qquad Y = \boldsymbol{\beta_1} + \beta_1 \, IPO\ Market\ Share + \beta_2 \, Ln\ Asset + \varepsilon,$$

where Y is an indicator variable for each of our IPO issuer corporate governance measures, specifically: large VC shareholding, VC directors, dual CEO-board chairman, founder CEOs, and staggered boards. The corporate governance measures are examined at the IPO date, and 1, 2, and 3 years after the IPO. *Ln Asset* is the issuer size at the time of IPO, and $\boldsymbol{\beta_1}$ is the vector of the 8 Gompers, Kovner, Lerner, and Scharfstein industry grouping indicator variables.

The top panel of Table 10B shows that the reputation of the VC syndicate and lead VC have significant positive associations with VC shareholdings at the IPO date and 1, 2 and 3 years after going public. Thus, more reputable VCs retain equity investments in IPO issuers more frequently than other less reputable VCs in the 3 years after going public. This creates VC incentives to continue to monitor the CEO and a VC's typically large shareholding can give VCs considerable influence as well.

The second panel repeats the analysis for VC directorships. Again, the syndicate and lead VC reputation measures have a significantly positive association with the frequency of VC holding board seats, not only at the IPO date, but also 1, 2 and 3 years after going public. Although both syndicate and lead VC reputation measures exhibit a significantly positive association with the frequency of VC directors remaining on issuer boards, the results for lead VCs are more significant. This evidence supports the hypothesis that more reputable VCs have a higher probability of continuing to sit on IPO issuer boards 1, 2, and 3 years after going public, which gives these VCs more influence over the corporate governance of their portfolio companies.

There are two possible interpretations of continued post-IPO VC shareholdings and directorships. First, their continued participation in the firm leads to better portfolio firm decisions and operations. Second, VCs continue to have positive proprietary information about firms' future prospects, which leads them to delay exiting these investments. We can not directly distinguish between these two interpretations. As a consequence, we also estimate a prediction model for continued VC participation in portfolio firms beyond the IPO or the typical lockup expiration date, six months later. This analysis is discussed in the next section.

The third panel shows that lead VC reputation has a significantly negative association with the probability of dual CEO-Chairman at the IPO date. The VC syndicate reputation measure is

not statistically significantly associated with this corporate governance feature. Thus, more reputable lead VCs are associated with firms having greater board oversight of CEOs that can presumably result in lower agency costs. The fourth panel shows that lead VC reputation has a significantly negative association with the likelihood of a founder-CEO at the IPO and 1 and 2 years thereafter. The VC syndicate reputation measure is not significantly associated with this corporate governance feature. These results are consistent with more reputable lead VCs taking steps to reduce CEO entrenchment and recruit professional managers to run these firms.

Finally, the fifth panel shows that VC syndicate reputation is only weakly associated with a reduced likelihood of staggered boards at their IPO dates, but not thereafter. Lead VC reputation is not significantly related to staggered boards. This is in line with Field and Karpoff (2002), who examine the frequency of takeover defenses at IPO firms, but fail to find a significant effect of VC backing. This evidence suggests that staggered boards may also serve some positive functions as argued by Ivanov and Masulis (2007).

In general, Table 10 shows that the more reputable VCs continue to hold shares and be represented on the board of their portfolio firms for as long as 3 years following the IPO, and that these VC firms establish stronger corporate governance in their portfolio firms. An alternative interpretation of some of these results is that more reputable VCs prefer to invest in firms with stronger governance. However, given that many VCs invest in firms at early stages in their lives, it is unlikely that their pre-VC corporate governance is very well established.

5.3 Relation of VC Reputation and Corporate Governance to Long-run Issuer Performance

In this section, we examine whether VC related corporate governance mechanisms are correlated with issuer long-run performance. Our evidence shows that more reputable VCs continue to advise and monitor their portfolio firms well beyond the IPO date; specifically they continue to hold shares and board seats in their portfolio firms for as long as three years following the IPO, and these VCs appear to promote stronger corporate governance in their portfolio firms. To examine the relation between VC involvement and the long-run post-IPO performance measures *ROA, M/B,* and *Listed*, we re-estimate the initial regressions in Tables 4-6, after adding our corporate governance measures as primary explanatory variables. We also replace the *Tech* firm indicator variable with the Gompers, Kovner, Lerner, and Scharfstein 8-industry grouping indicator variables. In further analysis, we add also several VC characteristics including *IPO Market Share* as explanatory variables.

This analysis is complicated by the fact that VCs can receive proprietary information about firms' future prospects, which can cause more reputable VCs that tend to invest in financially stronger firms to hold their shares and board seats well after the standard lockup termination

dates. To control for such selectivity, we use a two-stage Heckman estimation procedure using the inverse Mills' ratio to take account of selection bias. In the first stage logit regression, the frequency 3 years after the IPO of VC shareholdings, or alternatively, VC directorships, is regressed on indicator variables of VC shareholdings or directorships at the IPO, and on two other IPO characteristics, which we previously noted are not significantly related to post-issue long-run performance, *VC Syndicate Size* and *Revision*, as well as industry fixed effects. The estimated parameters from this model are used to calculate the inverse Mills' ratio included as an explanatory variable in the second-stage regression of post-IPO long-run performance. The inverse Mills' ratio captures the probability of more reputable VCs selecting better quality portfolio firms and choosing to remain invested beyond the typical lockup period. The expanded second-stage regression is:

(8) $P = \beta_0 + \beta_1 + \beta_1$ *VC Directors* $+\beta_2$ *CEO-Chairman* $+\beta_3$ *CEO-Founder* $+ \beta_4$ *Staggered Board* $+ \beta_5$ *Ln Size* $+\beta_6$ *Ln Age* $+\beta_7$ *IPO Market Share* $+ \beta_8$ *VC-backed* $+ \beta_9$ *Underwriter Reputation* $+ \beta_{10}$ *Bank-VC* $+\varepsilon$,

where β_0 is the vector of year fixed effects. The four corporate governance characteristics used as independent variables are (a) a count variable for VC directors that takes the values of 1, 2, or 3 respectively if the VC(s) holds directorship(s) 1, 2, or 3 years after the IPO and is zero otherwise, (b) an indicator variable for a dual CEO-board chairman 3 years after the IPO, (c) an indicator variable for a founder-CEO 3 years after the IPO, and (d) an indicator variable for a staggered board 3 years after the IPO. We also re-estimate the model after replacing the VC directorship index with a VC shareholdings index that takes a value of 1, 2, or 3 respectively if the VC(s) owns issuer shares 1, 2, and 3 years after the IPO and is zero otherwise. Given their high correlation, we do not include VC directorships and shareholdings in the same regression.

Table 11 presents the second-stage regression coefficients and associated *t*-statistics (*z*-statistics) based on standard errors robust to heteroskedasticity and industry clustering. To examine VC corporate governance effects on long-run performance, we examine two different variations of the above second-stage regression specification. In the first variation (shown in panel B), we do not include *IPO Market Share*, a VC backing indicator, underwriter reputation or a bank-VC backing indicator. In the second variation (shown in panel C), we include all of these explanatory variables to capture both VC reputation and corporate governance effects on post-IPO performance. In this latter regression, we view the VC reputation measure as capturing other VC support activities beyond the corporate governance mechanisms we control for. These other support activities can include continued access to the VC's private equity network and potentially a stronger and more independent board.

Panel A shows first-stage logit regression estimates in which, indicator variables for VC shareholdings and directorships at the IPO, *VC Syndicate Size*, *Revision*, and a 8-vector of industry indicators are regressed on the frequency of VC shareholdings, or alternatively VC directorships 3 years later. The likelihood of VC shareholdings 3 years after the IPO has a significant positive relation with VC shareholdings and directorships at the IPO date, while the likelihood of VC directorships 3 years after the IPO only has a significant positive association with VC directorships at the IPO date.

Panels B and C show the presence of VC directorships and VC shareholdings is significantly and positively related to post-issue long–run ROA and market-to-book ratio, but not with post-issue listing survival. The *CEO-Founder* and staggered board indicators are significantly and positively related to long-run survival of the IPO issuer. Lead VC *IPO Market Share* reputation has a significant positive relation to all three post-IPO long-run performance measures, even after controlling for issuer corporate governance features. Comparing the results in Table 11 with those in Tables 4-6, we see that the significance of the relation of VC reputation with post-IPO long-run performance falls with the inclusion of post-IPO issuer corporate governance characteristics. This result is to be expected given that VC reputation is correlated with these governance characteristics. Nevertheless, the lead VC reputation measure continues to have a significant positive relationship to future post-IPO issuer performance.

5.4 VC Reputation and Post-IPO Acquisition Premium

Acquisitions of VC-backed firms provide another profitable exit opportunity for VCs and their limited partners and represent another measure of the success of VC advice, monitoring and support of portfolio firms after they go public. Continued involvement by experienced VCs in portfolio firms after they go public can strengthen target negotiating positions with potential acquirers, and these VCs can also tap their private equity network to help stimulate competitive bids. Dai, Anderson, Bittlingmayer (2006) reports that VC-backed IPO firms are more likely to be acquired in the first few years after their IPOs compared to non-VC backed IPOs. Furthermore, it is well known that acquisitions of public companies, on average, result in large takeover premiums of over 30% [Andrade, Mitchell and Stafford (2001)]. In this section, we examine the average premiums paid for IPO issuers acquired by other firms within 3-years of going public for issuers backed by VCs of varying reputation. If continued involvement by more reputable VCs in portfolio firms adds value to these firms by strengthening their negotiation positions, then targets taken public by more reputable VCs should exhibit higher takeover premiums compared to targets taken public by the less reputable VCs.

There are 134 completed acquisitions of at least one major share block (defined as at least 5% of the target shares purchased in an acquisition transaction) of 105 separate VC-backed IPO issuers in our sample over the 3-year post-IPO period. A target's takeover premium is defined as the stock purchase price relative to the target stock's market price one day, one week and four weeks before the offer announcement. The average takeover premium is, respectively, 32%, 40% and 54% over the 134 acquisitions relative to target stock price one day, one week and four weeks before the offer announcement. For some targets, there is more than one completed acquisition of a large ownership block in the 3–year post-IPO period. For such firms, we compute the average target premium.

We begin our study of post-IPO acquisition activity by estimating the relation between lead VC reputation and the probability of a completed acquisition in the 3-year post-IPO period. Table 12A presents logit regression estimates for lead VC *IPO Market Share*, along with the issue related control variables in Table 6, except for IPO issue size, which is replaced by pre–acquisition firm size. The regressions are estimated over 822 VC-backed IPOs completed in the 1996-2002 period. Table l2A shows that lead VC reputation has a significant positive relation with the probability of acquisition, while commercial bank VC backing has a negative relation.

Next we examine the relation of VC reputation to acquisition purchase price by estimating the following regression for 105 acquisitions of VC-backed IPO issuers:

$$(9)\quad \textit{Target Takeover Premium} = \boldsymbol{\beta_I} + \beta_1\, \textit{Ln Asset} + \beta_2\, \textit{IPO Market Share} + \beta_3\, \textit{Ln Deal Size} + \beta_4\, \textit{Shares Acquired} + \beta_5\, \textit{Cash} + \beta_6\, \textit{Multiple Bidders} + \varepsilon,$$

where *Ln Asset* is the issuer size at the time of IPO, and $\boldsymbol{\beta_I}$ is the vector of indicator variables for the 8 Gompers, Kovner, Lerner, and Scharfstein VC industry groups. Deal related control variables include (a) *Ln Deal Size*, the natural logarithm of the dollar value of the transaction, (b) *Shares Acquired*, the percentage of the target shares purchased in transaction, (c) *Cash*, an indicator variable for pure cash deals, and (d) *Multiple Bidders*, an indicator variable for acquisitions that involved multiple bidders (see, for example, Stulz, Walkling, and Song (1990), and Moeller, Schlingemann, and Stulz (2004)). For our 134 transactions, the median transaction size is about $84 million, the average percent of shares acquired is 65%, and there are 37 pure cash deals. For firms having more than one completed acquisition of a large block of stock in the 3–year post-IPO period, we use the average value of the control variables across these multiple block acquisitions. Since our target firms are all publicly listed, we do not include a standard public/private target indicator variable.

Table 12B shows that lead VC *IPO Market Share* is significantly related to the takeover premium, where the premium is defined as the equity purchase price as a percent of the

target's closing stock price 1 day, 1 week or 4 weeks prior to offer announcement. Among the control variables, larger acquisitions, measured by *Shares Acquired*, and deals with multiple bidders are significantly associated with higher takeover premiums. It is important to note that differences in takeover defenses do not appear to explain higher takeover premiums in targets associated with the more reputable VCs because of (1) the difference in the frequency of staggered boards (a common anti-takeover provision) in firms backed by more and less reputable VCs is insignificant (Table 10), and (2) while firms backed by higher ranked VCs have a significantly higher acquisition frequency (Table 12A). Thus, the evidence in Table 12 shows that IPO firms backed by more reputable VCs are associated with (1) a significantly higher probability of a post-IPO acquisition and (2) a significantly higher takeover premium.

6. Evidence on Future IPO Success

6.1 VC Selectivity and Predicting Subsequent IPOs

An important complementary question to issuer long-run performance is whether more reputable VCs invest in companies that have a higher probability of going public in the near term. We match each of our six VC reputation measures for each VC each year to the number of completed IPOs that are backed by the same VC in the subsequent 3 years. For example, a VC's *IPO Market Share* in 2002 (constructed from data ending in 2001) is matched with the number of IPOs that occur in the VC's portfolio over 2002-2004. Since the number of successful IPOs by issuers a VC backs in the near future is likely to be dependent on the number of active portfolio companies they have, we need to deflate the VC's number of IPOs by the average number of portfolio companies the VC is funding over this period. For this purpose, *Future IPO Frequency* is defined as the number of completed IPOs by issuers a VC backs in the following 3 years, scaled by the average number of active portfolio companies the VC is funding at the beginning of the each of these 3 years. Given that our focus is on the frequency of IPOs from VC portfolio investments, our analysis is based on VC-backed IPO sample only.

We regress *Future IPO Frequency* on each of our six measures of VC reputation, as well as year fixed effects. The year fixed effects control for time-varying IPO market conditions, unrelated to VC reputation, which can affect the likelihood of successfully completing an IPO. As a robustness test, we replace yearly fixed effects, with one of two indicator variables – *Bubble* and *Cold IPO Market* – that respectively take a value of one if at least two of the next three years, include (1) the 1999-2000 bubble period, or (2) the 2001-2002 cold IPO market period as documented in Helwege and Liang (2004).

The likelihood of completing an IPO can also be influenced by industry facotrs. However since *Future IPO Frequency* measures IPOs taken public by a VC over the next 3 years, which

can come from multiple industries, industry fixed effects need to be carefully defined. We begin by classifying IPOs into one the 8 industry groups defined by Gompers, Kovner, Lerner, and Scharfstein (2006). If the proportion of IPO issuers taken public by a VC over the past 3 years is greater than 50% in any one of these 8 industries, then for that VC and year we assign a value of one to this industry indicator. Thus, we have a vector of 8 industry fixed effects for each row of our panel regression, which capture a VC's industry specialization based on its recent IPO success. We find that some top ranked VCs such as J.P. Morgan Partners, Kleiner Perkins, and New Enterprises Associates bring portfolio firms public from multiple industries, consistent with the Gompers, Kovner, Lerner, and Scharfstein finding.

We use a tobit regression specification for *Future IPO Frequency* since the dependent variable is constrained to be a non-negative fraction. In these panel regressions, both the dependant and independent variables are likely to exhibit serial correlation. To address this problem, we use year and industry-clustered standard errors to produce more accurate confidence intervals [see Petersen (2006)]. Table 13 shows that a VC syndicate's *IPO Market Share* has a significant positive association with the frequency of IPOs in their private equity portfolios over the following 3 years. *IPO %* and *IPO Frequency* are also significantly positively associated with future IPO success, but not as strongly as *IPO Market Share*. These results continue to hold if we replace year fixed effects with *Bubble* and *Cold IPO Market* indicators, or industry fixed effects with a *Tech* industry indicator. On average VCs with an *IPO Market Share* of 0.50% or more complete 10.36 IPOs over the next 3 years, compared to 1.15 IPOs for issuers backed by less reputable VCs.[21] Other VC reputation measures, such as *VC Age*, *VC Capital* and *VC Total Investment*, are insignificantly related to IPO frequency in the following 3 years. In summary, past IPO success, measured by *IPO Market Share*, *IPO %* and *IPO Frequency* all have significant predictive power for subsequent IPO success. We also find portfolio firms of VCs with *IPO Market Share* of 0.50% or more have a much higher future IPO success rate.

In the next section, we examine two potential reasons for the higher probability of IPOs by issuers backed by more reputable VCs, specifically that (1) more reputable VCs have stronger private equity networks and (2) IPOs backed by more reputable VCs exhibit stronger investor demand, which can raise investor interest in future IPOs the VC brings to market.

6.2 VC Reputation and Private Equity Networks

Another explanation for the superior long run performance of more reputable VCs investigated in Hochberg, Ljungqvist, and Lu (2007a and b) is these VCs have deeper and more

[21] We chose 0.50% *IPO Market Share* as the cut-off point because the top 25 VCs all have average yearly *IPO Market Shares* greater than 0.50% (see Appendix B).

extensive private equity networks, which they can tap to support the rapid growth of their portfolio firms. Private equity network contacts include financial services providers such as lawyers, accountants, commercial and investment bankers and other VCs. Prior research shows that IPO success is related to the quality of the intermediaries that back it. In this section, we examine whether in successful IPOs more reputable VCs (based on *IPO Market Share*) work with more reputable underwriters, auditors, and law firms and with more VC co-investors.

Lead underwriters conduct due diligence, help structure and market an issue, and play a role in certifying IPO issuer quality. Past evidence shows that underwriter quality can positively affect IPO pricing and post-IPO performance [Carter, Dark and Singh (1998)]. As discussed earlier, underwriter quality is typically measured by the Carter-Manaster reputation scores for the underwriting syndicate leads. More reputable auditors, typically classified as big-5 or big-4 accounting firms, can reduce information asymmetry by certifying the quality of issuer information and, thereby, positively affect IPO pricing and post-IPO performance [Balvers, McDonald and Miller (1988), and Beatty (1989)].

Legal advisors are responsible for insuring compliance with security regulations and disclosure requirements, which can lower information asymmetry for outside investors. Higher quality legal advisors can reduce IPO registration periods and strengthen IPO demand. Top law firms are defined as having larger market shares of IPO legal services. A law firm's market share of IPOs is defined as total gross proceeds of IPOs where they are an issuer legal advisor in the 3 calendar years immediately preceding the IPO as a proportion of the aggregate dollar value of all IPOs that named an issuer legal advisor in the same period, which we obtain from the SDC Global New Issues database [see Beatty and Welch (1996) for a similar approach]. Each law firm named an IPO issuer legal advisor is given full credit for an IPO. We then classify law firms with more than 1 percent market share in a year as a top tier firm. The numbers of top tier law firms in years 1996-2002 are 20, 20, 18, 18, 23, 25, and 26 respectively.[22]

Examining the association of VC reputation with network characteristics: *Underwriter Reputation (*Carter-Manaster lead underwriter reputation score), *Top Law* (indicator for IPO firms having top tier legal advisors) and *Top Auditor* (indicator for IPO firms having a big 4 auditor), we find that of VC-backed IPOs 23% are advised by top law firms and 82% employ a top auditing firm. Splitting the sample by VC reputation, we find IPO firms backed by a highly reputable lead VC (*IPO Market Share* of 1% or more) employ top law firms, top auditors and top underwriters significantly more frequently than IPO firms backed by other lead VCs.

[22] Well-known law firms consistently classified in the top tier are: Wilson Sonsini, Goodrich & Rosati, Sullivan & Cromwell, Davis Polk, Skadden Arps, Simpson Thacher, Latham & Watkins and Shearman & Sterling.

We also analyze the association between *VC Syndicate Size* as of its IPO date and lead VC *IPO Market Share*.[23] The associations of VC reputation with *Underwriter Reputation* and *VC Syndicate Size* are estimated using a Tobit regression, given that these variables are bounded from below at 1.0 and underwriter reputation is also bounded from above at 9.1. A logit regression model is used to estimate the relationship of VC reputation with the *Top Law* and *Top Auditor* indicators.

Table 14A shows that VC syndicate *IPO Market Share* has significant positive relations to IPOs using more reputable lead underwriters, legal advisors and auditors. The table also shows that the associations of lead VC reputation with VC network characteristics are qualitatively similar, though stronger than those found for the entire VC syndicate. In addition, lead VC reputation has a significantly positive association with larger VC syndicates, suggesting that more reputable lead VCs are more able to attract other VCs to their syndicates.

6.3 *VC Reputation and IPO Issue Characteristics*

We next examine the relation between *IPO Market Share* and IPO characteristics which proxy for strong investor demand and offer success: namely *Registration Period*, *Hot IPO*, *Hot Issue Market*, and *Shares Offered*, which are defined below. We examine how these characteristics vary across IPOs backed by more and less reputable VCs. One measure of IPO demand is the length of the registration period, measured by the initial filing date to issue date interval. A shorter registration period enables better market timing of IPOs and is linked to the experience and expertise of the financial intermediaries involved. Hanley (1993) measures IPO demand by offer price revision, defined as the percentage change of the IPO offer price from the midpoint of the high and low prices of the initial filing range. We modify this variable to be an indicator which takes a value of one when the offer price revision is positive, and label it *Hot IPO*. We also examine whether IPOs occur in hot issue markets studied by Helwege and Liang (2004). We define *Hot Issue Market* as an indicator variable for IPOs completed in months classified as having abnormally high numbers of IPOs by Helwege and Liang. Finally, we examine *Shares Offered,* defined as the number of primary shares sold relative to pre-IPO shares outstanding. Since underwriters can demand a reduction in offer size when investor demand is low and encourage issuers to raise offer size when investor demand is high, we view higher relative offering size, *Shares Offered*, as indicative of greater investor demand for an IPO.

The average *Registration Period* for our VC-backed IPO sample is approximately 80 days, and 38.5% of the IPOs exhibit high investor demand, denoted by *Hot IPOs*. IPOs backed by more reputable lead VCs (with a *IPO Market Share* of 1% or more) have a mean *Registration Period* of

[23] We limit our examination of syndicate size to lead VCs, since most small VCs invest alone or in small syndicates.

about 69 days, compared to 88 days for IPOs backed by other lead VCs. Of IPOs backed by the most reputable lead VCs, about 42% are *Hot IPO*s, which is significantly higher (at the 10% level) than the 36% found for IPOs backed by less reputable lead VCs.

To investigate VC reputation's association with two positively constrained variables, *Registration Period* and *Shares Offered*, a tobit model is used and for the two binary variables, *Hot IPO* and *Hot Issue Market*, a logit model is used. Each of these IPO issue characteristics is regressed on *IPO Market Share*, firm size and year and industry fixed effects. Industry fixed effects capture industry expertise and include the eight VC related industries studied in Gompers, Kovner, Lerner, and Scharfstein (2006).

Regression estimates in Table 14B show that VC reputation is positively related to (1) issue quality, measured by shorter IPO registration periods and (2) higher investor demand, measured by the *Hot IPO* indicator. Interestingly, VC reputation is significantly *negatively* associated, albeit weakly, with hot issue market IPOs. Thus, portfolio firm backed by more reputable VCs do not appear to time their IPOs to occur in hot issue markets. This suggests that higher ranked VCs have longer investment horizons and are not trying to exploit IPO investors, which is consistent with the Helwege and Liang (2004) findings that IPO issuers in hot issue markets are of lower quality, spend less on capital expenditures and have negative earnings more often (especially for IPOs in the late 1990s hot issue period).

The relations between VC reputation and IPO investor demand and IPO quality measures are arguably stronger for lead VC reputation. In addition, lead VC reputation has a significantly positive association with *Shares Offered,* which also indicates higher investor demand for IPOs brought to market by more reputable lead VCs. In summary, the results in Table 14 show that more reputable VCs on average have stronger private equity networks measured in terms of the reputations of the financial intermediaries associated with their IPOs, which are also perceived to be of higher quality and to elicit greater investor demand.

7. Conclusion

The roles VCs play in the private equity market is a topic of considerable academic interest, particularly with respect to IPOs. Yet, prior studies generally treat VCs as indistinguishable and examine the association between key IPO characteristic and an indicator of VC-backing. We investigate the usefulness of distinguishing VCs by reputation and examine its relations to IPO issuer long-run performance and the probability of later IPOs from VC investments.

We examine six alternative measures of VC reputation and analyze their relations to several well-known measures of long-run performance including issuer industry-adjusted rate of return on assets, market-to-book ratio, and listing survival on a major stock exchange. A VC's

past market share of VC-backed IPOs, *IPO Market Share*, consistently shows a significant positive relation with all the post-IPO issuer long-run performance measures we investigate. We conclude that VC reputation has an economically and statistically significant association with the subsequent investment success of IPO issuers a VC backs. This result holds regardless of whether we use the reputation of the VC syndicate or the lead VC. We find that *IPO Market Share* is also significantly positively associated with the probability of future IPOs.

We investigate several potential explanations for the positive relationships between VC reputation and (1) superior post-IPO long-run performance and (2) future IPOs. Examining VC activities post-IPO, we find that more reputable VCs retain large blocks of shares and board seats longer, even three years later. More reputable VCs are also associated with stronger corporate governance in the IPO firms they back, which extends into the post-IPO period. We find that continued VC shareholding and directorships have significant positive associations with the long-run performance of IPO issuers, but VC reputation itself retains a significant positive association with post-issue long-run performance, even after controlling VC shareholding and board positions and adjusting for the VC screening process. Also, more reputable VCs are associated with IPO issuers having brighter growth prospects, as reflected in their significantly higher ratios of R&D expenses to capital expenditures and R&D expenses plus capital expenditures to total assets 3 years later. IPO firms backed by higher ranked VCs are also more likely to be acquisition candidates and to receive higher takeover premiums.

Finally, we uncover evidence that future IPO success is partially due to superior VC networking, which can raise IPO investor demand. More reputable VCs are associated with superior private equity networking reflected in the participation of more reputable investment bankers, law firms and auditors, as well as a greater numbers of other VCs, which all appear to raise investor demand and the probability of a successful IPO underwriting. Indeed, more reputable VCs back issuers with a higher proportion of hot IPOs and shorter registration periods. Thus, we conclude that more reputable VCs select better venture investments and offer better support and development of their ventures, pre-IPO, at the IPO, and even 3 years later.

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Appendix A
Definitions of Variables

IPO Performance Measures	*Description*
Future IPO Frequency	The number of successfully completed IPOs backed by a VC in the 3 years in the future scaled by the average of the number of the portfolio companies at the beginning of the each of those 3 years that are being currently funded by the same VC.
ROA	The match-adjusted return on assets (ROA), computed as net income divided by total assets, as at the end of the 3rd year (12th quarter after the quarter of the offer date) for the IPO firm minus the industry median ROA on the same date, where the industries are based on 4 digit SIC codes if there is a minimum of 5 non-issuing firms, else 3 digit SICs codes, or 2 digit SIC codes until there are at least 5 non-issuing firms. We use the nth quarter measure, where n <12 for firms that do not survive for 3 years post issue.
MB	The market to book ratio is measured at the end of the 12th quarter after the IPO quarter. We use the nth quarter measure, where n <12 for firms that do not survive for 3 years post issue.
Listed	An indicator variable that takes a value of 1 for firms that remain listed on the NYSE, Amex or Nasdaq (i.e., remain in the CRSP database), or are merged or acquired by a listed firm, which remains listed at least through the end of the 12th quarter after the IPO, and equals 0 otherwise (firms that become bankrupt, defunct or liquidated (CRSP delisting codes 400 and above)).
R&D expenditure/ Capital Expenditure	The ratio of research and development expenditures (R&D) to capital expenditures as at the end of the third year after the IPO, computed using Compustat annual financial statement database.
(R&D + Capital Expenditure) / Total Assets	The ratio of research and development expenditures (R&D) plus capital expenditures to total assets as at the end of the third year after the IPO, computed using Compustat annual financial statement database.
VC Reputation Measures	*Description*
IPO Market Share	The market share of a VC is based on the dollar value of IPO deals that the VC backed in the 3 calendar years immediately preceding each IPO, as a proportion of the dollar value of all VC-backed IPOs in the same period. Each VC associated with an IPO is given full credit for the issue size of the IPO. That is, for IPOs made in 2000, it is the dollar market share of the IPO market for a VC in the years 1997-1999.
Share of VC-backed IPOs	The share of VC-backed IPOs is defined as the number of IPO deals that the VC backed in the 3 calendar years immediately preceding each IPO, as a proportion of all VC-backed IPOs in the same period.

IPO %	A VC's dollar investments in firms that had IPOs completed in the 3 calendar years immediately prior to each new IPO, scaled by the average of the VC's total investments as of beginning of year 1 and the end of year 3 of the event window.
IPO Frequency	The number of IPOs made in the 3 calendar years immediately prior to each IPO from a VC's investment portfolio, scaled by the average number of the VC's active portfolio firms as of the beginning of year 1 and the end of year 3 of the event window.
VC Age	The age of the VC computed from the date of its incorporation to the IPO date.
VC Capital	The dollar amount (in millions) invested or available for investment by a VC, as of the year-end immediately prior to each IPO.
VC Total Investment	The dollar amount of venture capital financing (disbursements) a VC made in its portfolio companies as of the year-end immediately prior to each IPO.

Control Variables	*Description*
Ln Size	The natural log of the size of the IPO: gross proceeds from the offering, exclusive of overallotment options.
Ln Age	The natural log of the age (in years) of the issuer at the time of the offering, as computed from the date of incorporation to the date of the offering.
Ln Asset	The natural log of the IPO issuer's total assets at the end of the quarter immediately prior to the IPO date.
Bank-VC	Indicator variable that takes the value of 1 if any VC backing an IPO is a commercial bank, and 0 otherwise.
Underwriter Reputation	The lead underwriter reputation score measured by the Carter-Manaster score, as modified by Ritter and made available on his web site: *http://bear.cba.ufl.edu/ritter/rank.xls*
Tech	Indicator Variable that is 1 for IPOs made by Tech firms, and 0 otherwise. Tech firms are defined as those with issuer SIC codes 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3674 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812, 4813 (telephone equipment), and 4899 (communication services).
VC-backed	Indicator variable that takes the value of 1 for VC-backed IPOs and 0 otherwise.

Appendix B
Top 25 VCs

This Appendix lists the top 25 VCs based on averaging their annual *IPO Market Shares* over 1996-2002.

Rank	*VC*	Average of annual *IPO Market Share* (in %)
1	J.P. Morgan Partners	2.13
2	Kleiner Perkins Caufield & Byers	1.39
3	New Enterprise Associates	1.17
4	Sequoia Capital	1.00
5	Integral Capital Partners	0.94
6	Alta Partners	0.92
7	Warburg Pincus	0.87
8	Accel Partners	0.86
9	Sprout Group	0.85
10	TA Associates	0.82
11	Summit Partners	0.78
12	DLJ Merchant Banking Partners	0.77
13	Norwest Venture Partners	0.75
14	Lightspeed Venture Partners	0.73
15	Oak Investment Partners	0.71
16	Pilgrim Baxter & Associates	0.70
17	Institutional Venture Partners	0.70
18	Greylock	0.68
19	Mayfield Fund	0.66
20	Goldman, Sachs & Co.	0.65
21	Centennial Ventures	0.64
22	HarbourVest Partners	0.58
23	Bessemer Venture Partners	0.58
24	Technology Crossover Ventures	0.57
25	U.S. Venture Partners	0.57

Table 1
Descriptive Statistics of IPO Sample

Panel A reports the number of non-VC-backed and VC-backed IPOs by year in our sample for IPOs completed in the 1996-2002 period, during which we evaluate a VC's IPO performance. Panel B reports means and medians for the *ROA*, *M/B*, and *Listed* long-term performance measures and the number of observations for non-VC-backed and VC-backed IPOs. Panel C shows the mean *Size* of the issue, *Age* of the issuer, *Underwriter Reputation*, and proportions of the IPOs that are from *Tech* industries for our non-VC-backed and VC-backed IPO samples. The variables are defined in Appendix A.

Panel A

Year	*Non VC-backed IPOs*	*VC-backed IPOs*
1996	343	209
1997	262	112
1998	182	60
1999	229	201
2000	112	204
2001	39	17
2002	30	19
Total	1197	822

Panel B

	Non VC-backed IPOs (N = 1197)	*VC-backed IPOs (N = 822)*
Variable	Mean	Mean
Size ($m)	57.54	58.11
Age (years)	11.49	7.68**
Tech (%)	11.95	22.90***
Underwriter Reputation	6.57	8.14*

Panel C

	Non VC-backed IPOs		*VC-backed IPOs*	
Variable	N	Mean	N	Mean
ROA	1154	0.29	787	0.56***
M/B	1154	2.95	787	4.43***
Listed (in %)	1197	84.46	822	88.08*
R&D Expenditure/Capital Expenditure	837	4.64	560	17.66***
(R&D + Capital Expenditure) / Total Assets	837	0.14	560	0.24**

*, **, and *** denote significant difference in the means of the two groups at the 10%, 5% and 1% levels respectively.

Table 2
Descriptive Statistics of VC Reputation Measures

Panel A presents descriptive statistics for our alternative measures of VC reputation. All variables are defined in Appendix A. Panel B shows the pair-wise Pearson's correlations.

Panel A: Descriptive Statistics

	Mean	Median	Std Dev	Max	Min
IPO Market Share (in %)	0.42	0.36	0.30	1.72	0.01
IPO % (in %)	21.85	21.29	6.58	69.30	8.09
IPO Frequency (in %)	22.79	21.30	10.39	68.10	2.36
VC Age (in years)	13.97	13.74	7.12	50.80	0.10
VC Capital (in $b)	3.60	1.74	4.95	25.00	4.00
VC Total Investment (in $b)	2.16	1.51	2.12	10.69	3.72

Panel B: Correlations

	IPO %	*IPO Frequency*	*VC Age*	*VC Capital*	*VC Total Investment*
IPO Market Share	0.399	0.350	0.142	0.470	0.579
IPO %		0.756	0.049	0.106	0.167
IPO Frequency			0.073	0.037	0.088
VC Age				0.064	0.019
VC Capital					0.922

Table 3
Cross sectional Regressions of IPO Issuer Characteristics on VC Reputation Measures

This table presents coefficient estimates and in parentheses, the associated *t*-statistics based on heteroskedasticity consistent standard errors adjusted for industry clustering where one of the alternative VC reputation measures, *VC Reputation*, is regressed on IPO issue variables listed below. The equation specified below is estimated with a tobit regression:

$$\textit{VC Reputation Measure} = \beta_0 + \beta_1\, \textit{Underwriter Reputation} + \beta_2\, \textit{Ln Asset} + \beta_3\, \textit{Ln Size} + \beta_4\, \textit{Ln Age} + \beta_5 \textit{Tech} + \varepsilon,$$

where β_0 is a vector of year fixed effects. All variables are defined in Appendix A. In Panel A, *VC Reputation* represents the VC syndicate and is the average reputation of all the VCs investing in an IPO issuer. In Panel B, *VC Reputation* is based on the lead VC, defined as the VC that had the maximum investment in the issuer as of the IPO date. The regressions are estimated over 822 VC-backed IPOs completed in the 1996-2002 period.

Panel A

VC Syndicate Reputation Measure	*Underwriter Reputation*	*Ln Asset*	*Ln Size*	*Ln Age*	*Tech*	*Adjusted R^2*
IPO Market Share	0.04***	-0.03***	-0.02	-0.01*	0.06***	17.76%
	(2.80)	(-4.24)	(-1.55)	(-1.64)	(3.50)	
IPO %	0.02***	-0.02***	-0.01*	-0.00*	0.02***	26.98%
	(2.89)	(-5.49)	(-1.86)	(-1.77)	(3.10)	
IPO Frequency	0.02***	-0.02***	-0.01**	-0.00*	0.02***	23.30%
	(2.89)	(-4.66)	(-2.10)	(-1.68)	(3.19)	
VC Age	1.29***	-0.96***	-0.64*	-0.00	2.01***	21.71%
	(2.64)	(-4.72)	(-1.71)	(-0.04)	(4.34)	
VC Capital	0.03***	-0.02***	-0.00	-0.00	0.00	10.66%
	(2.66)	(-2.68)	(-0.48)	(-0.86)	(0.22)	
VC Total Investment	0.02***	-0.01***	-0.00	-0.00	0.00	14.71%
	(2.74)	(-3.23)	(-0.64)	(-1.00)	(0.11)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Panel B

Lead VC Reputation Measure	*Underwriter Reputation*	*Ln Asset*	*Ln Size*	*Ln Age*	Tech	*Adjusted R^2*
IPO Market Share	0.09***	-0.05***	-0.06**	-0.02*	0.09***	19.20%
	(3.51)	(-3.99)	(-2.40)	(-1.75)	(3.10)	
IPO %	0.02***	-0.02***	-0.01	-0.00	0.02***	24.22%
	(2.94)	(-4.62)	(-1.31)	(-1.54)	(2.67)	
IPO Frequency	0.02***	-0.01***	-0.01*	-0.00	0.02***	23.47%
	(3.03)	(-4.04)	(-1.91)	(-1.45)	(2.86)	
VC Age	1.54***	-1.12***	-0.74*	-0.20	1.04**	23.39%
	(2.81)	(-5.02)	(-1.79)	(-1.00)	(2.03)	
VC Capital	0.04**	-0.03***	-0.00	-0.00	0.00	8.17%
	(1.98)	(-2.57)	(-0.90)	(-0.91)	(0.33)	
VC Total Investment	0.02**	-0.02***	-0.00	-0.00	0.00	12.95%
	(2.32)	(-3.39)	(-1.15)	(-1.57)	(1.40)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 4
Cross-sectional Regressions of Issuer Long-run Industry-adjusted *ROA*

This table presents coefficient estimates and in parentheses associated *t*-statistics based on standard errors which are robust to heteroskedasticity and industry clustering. The post-IPO long-run match-adjusted *ROA*, purged of any survivorship bias, is regressed on one of the alternative VC reputation measures, *VC Reputation*, using the following OLS regression specification:

$$ROA = \beta_0 + \beta_1 \text{ VC Reputation} + \beta_2 \text{ VC-backed} + \beta_3 \text{ Underwriter Reputation} + \beta_4 \text{ Bank-VC} + \beta_5 \text{ Ln Size} + \beta_6 \text{ Ln Age} + \beta_7 \text{ Tech} + \varepsilon,$$

where β_0 is a vector of year fixed effects. All other variables are defined in Appendix A. In Panel A, *VC Reputation* represents the VC syndicate and is the average reputation of all the VCs investing in an IPO issuer. In Panel B, *VC Reputation* is based on the lead VC, defined as the VC that had the maximum investment in the issuer as of the IPO date. The regressions are estimated over 1941 IPOs completed in the period 1996-2002, where data for all the above variables are available.

Panel A

	VC Reputation Measure	*VC-backed*	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	Tech	*Adjusted R^2*
IPO Market Share	0.57***	-0.11	0.03**	-0.21**	-0.01	0.04***	-0.14	5.40%
	(2.83)	(-0.59)	(2.47)	(-2.15)	(-0.17)	(3.79)	(-1.00)	
IPO %	0.02***	-0.26	0.03***	-0.21**	-0.01	0.04***	-0.14	5.15%
	(5.78)	(-1.54)	(2.84)	(-2.50)	(-0.18)	(5.24)	(-1.01)	
IPO Frequency	0.01***	-0.17	0.03**	-0.24***	-0.01	0.04***	-0.14	5.27%
	(6.85)	(-0.99)	(2.41)	(-2.83)	(-0.13)	(4.54)	(-0.99)	
VC Age	0.01*	0.07	0.03***	-0.27***	-0.01	0.04***	-0.14	4.97%
	(1.78)	(0.34)	(2.85)	(-3.54)	(-0.22)	(3.78)	(-0.96)	
VC Capital	0.35***	0.01	0.03***	-0.26***	-0.01	0.04***	-0.12	5.44%
	(7.76)	(0.09)	(3.04)	(-3.22)	(-0.27)	(4.24)	(-0.94)	
VC Total Investment	0.92***	-0.07	0.03***	-0.24***	-0.01	0.04***	-0.11	5.56%
	(13.14)	(-0.47)	(2.93)	(-3.19)	(-0.33)	(3.97)	(-0.92)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Panel B

	Lead VC Reputation Measure	*VC-backed*	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	Tech	*Adjusted R^2*
IPO Market Share	0.30***	-0.10	0.03**	-0.23**	-0.00	0.04***	-0.13	5.35%
	(3.72)	(-0.58)	(2.06)	(-2.36)	(-0.06)	(4.18)	(-0.98)	
IPO %	0.02***	-0.36	0.03***	-0.22***	-0.01	0.04***	-0.13	5.58%
	(6.76)	(-1.01)	(3.00)	(-2.60)	(-0.35)	(5.02)	(-1.02)	
IPO Frequency	0.01***	-0.21	0.03**	-0.23***	-0.01	0.04***	-0.13	5.35%
	(6.85)	(-1.06)	(2.33)	(-2.73)	(-0.20)	(4.86)	(-1.00)	
VC Age	0.02***	-0.25	0.03**	-0.24***	-0.01	0.04***	-0.13	5.43%
	(6.79)	(-1.53)	(2.41)	(-2.83)	(-0.12)	(3.78)	(-0.94)	
VC Capital	0.19***	0.05	0.03***	-0.24***	-0.01	0.04***	-0.13	5.15%
	(3.31)	(0.27)	(2.65)	(-2.62)	(-0.19)	(4.09)	(-0.91)	
VC Total Investment	0.45**	0.02	0.03***	-0.24**	-0.01	0.04***	-0.14	5.14%
	(2.32)	(0.08)	(2.62)	(-2.39)	(-0.19)	(4.22)	(-0.91)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 5
Cross-sectional Regressions of Issuer Long-run Market-to-Book Ratio

This table presents coefficient estimates and in parentheses associated *t*-statistics based on standard errors which are robust to heteroskedasticity and industry clustering. The post-IPO long-run market-to-book ratio, *M/B*, purged of any survivorship bias, is regressed on one of the alternative VC reputation measures, *VC Reputation*, using the following OLS regression model:

$$M/B = \beta_0 + \beta_1 \text{ VC Reputation} + \beta_2 \text{ VC-backed} + \beta_3 \text{ Underwriter Reputation} + \beta_4 \text{ Bank-VC} + \beta_5 \text{ Ln Size} + \beta_6 \text{ Ln Age} + \beta_7 \text{ Tech} + \varepsilon,$$

where β_0 is a vector of year fixed effects. All other variables are defined in Appendix A. In Panel A, *VC Reputation* represents the VC syndicate and is the average reputation of all the VCs investing in an IPO issuer. In Panel B, *VC Reputation* is based on the lead VC, defined as the VC that had the maximum investment in the issuer as of the IPO date. The regressions are estimated for 1941 IPOs completed in the period 1996-2002, where data for all the above variables are available.

Panel A

	VC Reputation	*VC-backed*	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	Tech	*Adjusted* R^2
IPO Market Share	1.34***	1.17**	0.08	-0.28	-0.42**	-0.21	0.37	4.23%
	(2.57)	(1.98)	(1.01)	(-0.46)	(-2.09)	(-1.57)	(1.18)	
IPO %	0.02	1.31**	0.09	-0.30	-0.42**	-0.21*	0.39	4.01%
	(0.72)	(1.96)	(1.11)	(-0.49)	(-2.12)	(-1.66)	(1.24)	
IPO Frequency	0.03*	1.00**	0.08	-0.33	-0.41**	-0.21*	0.39	4.17%
	(1.89)	(2.02)	(1.06)	(-0.54)	(-2.08)	(-1.68)	(1.23)	
VC Age	0.10	1.89***	0.10	-0.29	-0.43**	-0.18	0.34	3.84%
	(0.54)	(4.15)	(1.23)	(-0.48)	(-2.23)	(-1.46)	(1.09)	
VC Capital	0.00	1.74***	0.10	-0.34	-0.42**	-0.20	0.36	3.90%
	(0.10)	(5.55)	(1.24)	(-0.55)	(-2.13)	(-1.53)	(1.13)	
VC Total Investment	0.00	1.74***	0.10	-0.34	-0.42**	-0.20	0.35	3.90%
	(0.05)	(5.11)	(1.24)	(-0.55)	(-2.13)	(-1.53)	(1.13)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Panel B

	Lead VC Reputation Measure	*VC-backed*	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	Tech	*Adjusted R^2*
IPO Market Share	1.01***	1.17	0.07	-0.42***	-0.27	-0.21	0.49	4.17%
	(3.66)	(1.42)	(0.64)	(-2.57)	(-0.82)	(-1.12)	(1.39)	
IPO %	0.04	1.90**	0.09	-0.50***	-0.30	-0.21	0.49	4.68%
	(0.36)	(2.19)	(0.69)	(-3.83)	(-0.84)	(-1.16)	(1.34)	
IPO Frequency	0.08	1.78***	0.08	-0.49***	-0.29	-0.22	0.49	4.70%
	(0.72)	(2.60)	(0.70)	(-3.91)	(-0.84)	(-1.16)	(1.36)	
VC Age	-0.02	2.30***	0.09	-0.52***	-0.30	-0.21	0.48	4.71%
	(-1.09)	(5.17)	(0.71)	(-3.92)	(-0.86)	(-1.16)	(1.30)	
VC Capital	0.00	1.89***	0.08	-0.48***	-0.29	-0.22	0.50	4.71%
	(1.58)	(2.73)	(0.69)	(-3.25)	(-0.84)	(-1.15)	(1.35)	
VC Total Investment	0.00*	1.87**	0.08	-0.48***	-0.29	-0.21	0.50	4.90%
	(1.67)	(2.17)	(0.69)	(-3.19)	(-0.84)	(-1.15)	(1.35)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 6
Cross-sectional Regressions of Issuer Long-run Listing Survival

This table presents logit regression coefficients and in parentheses associated *z*-statistics based on standard errors robust to heteroskedasticity and industry clustering. An indicator variable for firms that remain listed in the CRSP database for 36 months following their IPOs, *Listed*, is regressed on one of the alternative VC reputation measures, *VC Reputation*, using the following specification:

$$Listed = \beta_0 + \beta_1 \, VC\ Reputation + \beta_2 \, VC\text{-}backed + \beta_3 \, Underwriter\ Reputation + \beta_4 \, Bank\text{-}VC + \beta_5 \, Ln\ Size + \beta_6 \, Ln\ Age + \beta_7 \, Tech + \varepsilon,$$

where β_0 is a vector of year fixed effects. All other variables are defined in Appendix A. In Panel A, *VC Reputation* represents the average reputation of the VC syndicate. In Panel B, *VC Reputation* represents the reputation of the lead VC, defined as the VC that had the maximum investment in the issuer as of the IPO date. There were 186 delisted non-VC-backed issuers, and 98 delisted VC-backed issuers. The regressions are estimated for 2019 IPOs completed in the period 1996-2002, where data for all the above variables are available.

Panel A

	VC Reputation	*VC-backed*	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	Tech	*Pseudo* R^2
IPO Market Share	0.96**	-0.01	0.20***	-0.57*	0.19	0.38***	0.14	10.64%
	(2.32)	(-0.05)	(4.68)	(-1.73)	(0.93)	(5.15)	(0.68)	
IPO %	0.03*	-0.35	0.21***	-0.53*	0.18	0.38***	0.15	10.53%
	(1.82)	(-0.84)	(4.79)	(-1.64)	(1.51)	(5.10)	(0.76)	
IPO Frequency	0.01	0.11	0.21***	-0.60*	0.18	0.38***	0.15	10.40%
	(0.91)	(0.37)	(4.83)	(-1.83)	(1.50)	(5.13)	(0.75)	
VC Age	0.03*	-0.10	0.22***	-0.64*	0.16	0.39***	0.14	10.91%
	(1.86)	(-0.38)	(5.18)	(-1.94)	(1.33)	(5.32)	(0.72)	
VC Capital	0.03	0.23	0.21***	-0.62*	0.18	0.38***	0.20	10.54%
	(1.05)	(1.18)	(4.91)	(-1.89)	(1.50)	(5.09)	(0.96)	
VC Total Investment	0.06	0.20	0.21***	-0.62*	0.18	0.37***	0.20	10.52%
	(0.99)	(0.95)	(4.91)	(-1.87)	(1.49)	(5.09)	(0.98)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Panel B

	Lead VC Reputation Measure	*VC-backed*	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	Tech	*Pseudo R^2*
IPO Market Share	0.46***	-0.03	0.21***	-0.59*	0.20	0.38***	0.14	10.55%
	(4.57)	(-0.38)	(4.77)	(-1.79)	(1.63)	(4.78)	(0.74)	
IPO %	0.01***	0.04	0.21***	-0.55*	0.22**	0.40***	0.18	11.08%
	(2.51)	(0.15)	(4.48)	(-1.83)	(2.04)	(5.19)	(0.91)	
IPO Frequency	-0.04	0.33	0.21***	-0.57*	0.22**	0.40***	0.17	11.03%
	(-0.13)	(1.31)	(4.03)	(-1.95)	(2.11)	(5.32)	(0.84)	
VC Age	0.07***	-0.26	0.21***	-0.55*	0.23**	0.40***	0.20	12.22%
	(2.71)	(-1.23)	(4.64)	(-1.77)	(2.36)	(4.94)	(0.87)	
VC Capital	0.02*	0.23	0.21***	-0.58*	0.22**	0.41***	0.18	11.09%
	(1.81)	(0.87)	(4.78)	(-1.81)	(2.10)	(4.92)	(0.93)	
VC Total Investment	0.13***	0.02	0.21***	-0.53*	0.23**	0.41***	0.19	11.38%
	(9.98)	(0.09)	(5.29)	(-1.65)	(2.26)	(4.49)	(1.17)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 7
VC Reputation and Issuer Long-run Performance
After Controlling for Self-Selection

This table presents two-stage-Heckman regression coefficients and in parentheses associated *t*-statistics. In a first step, a logit regression is estimated for the likelihood of having a highly ranked VC, based on an IPO market share of VC-backed deals above the median. The associated *t*-statistics (or *z*-statistics in the case of logit regression) are based on standard errors robust to heteroskedasticity and industry clustering. The first stage regression equation is:
$VC\ Rank = \alpha_0 + \alpha_1 Ln\ Asset + \alpha_2 Ln\ Size + \alpha_3 Ln\ Age + \alpha_4 Tech + \varepsilon,$
where VC Rank is a binary variable that equals 1 if *IPO Market Share* > median IPO Market Share and 0 otherwise. The inverse Mills' ratio estimated from the first stage regression is used in the following second stage regression:
$P = \beta_0 + \beta_1 IPO\ Market\ Share + \beta_2 VC\text{-}backed + \beta_3 Underwriter\ Reputation + \beta_4 Bank\text{-}VC + \beta_5 Ln\ Size + \beta_6 Ln\ Age + \beta_7 Tech + \beta_8 Inverse\ Mills + \nu,$
where as before β_0 is the vector of year fixed effects and *P* represents one of the issuer performance measures: *ROA*, *M/B*, or *Listed*. All the variables are defined in Appendix A. In Panel A, syndicate *VC Reputation* is used, while in Panel B, lead *VC Reputation*, defined as the VC with the largest issuer investment as of the IPO date, is used. Panel C shows the second-stage regression estimates when we estimate a simultaneous equations model using two-stage least squares procedure with the continuous variable -- *IPO Market Share* -- in place of *VC Rank* in the first stage and with *Ln Asset* as a first-stage instrumental variable. The regressions are estimated for 1941, 1941, and 2019 IPOs completed in the period 1996-2002, when the dependant variable is *ROA*, *M/B* and *Listed* respectively.

Panel A

Stage 1 Estimates

	Ln Asset	*Ln Size*	*Ln Age*	*Tech*	*Intercept*	*Pseudo R^2*
VC Syndicate Rank	-0.19***	0.37***	-0.11*	0.55***	-1.44***	6.47%
	(-2.78)	(3.33)	(-1.91)	(3.61)	(-2.91)	

Stage 2 Estimates

	IPO Market Share	*VC-backed*	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	*Tech*	Inverse Mills' Ratio	*Adjusted/ Pseudo R^2*
R0A	0.56***	-0.14	0.03***	-0.21**	-0.12*	0.08***	-0.31***	-0.64***	5.69%
	(2.62)	(-0.72)	(2.94)	(-2.09)	(-1.85)	(4.07)	(-2.76)	(-3.34)	
MB	1.64***	0.86**	0.12	-0.10	-1.37***	-0.05	-1.02**	-5.53***	5.69%
	(2.59)	(2.12)	(1.56)	(-0.15)	(-2.89)	(-0.37)	(-2.43)	(-5.09)	
Listed	0.94**	0.14	0.15***	-0.60*	0.60***	0.27***	0.70	1.75**	10.94%
	(2.12)	(0.59)	(3.17)	(-1.67)	(3.02)	(3.00)	(1.60)	(2.53)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Panel B

Stage 1 Estimates

	Ln Asset	*Ln Size*	*Ln Age*	*Tech*	*Intercept*	*Pseudo R^2*
Lead VC Rank	-0.26***	0.47***	-0.02	0.64***	-2.16***	6.89%
	(-4.44)	(4.94)	(-0.32)	(5.30)	(-4.49)	

Stage 2 Estimates

	Lead IPO Market Share	*VC-backed*	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	*Tech*	Inverse Mills' Ratio	*Adjusted/ Pseudo R^2*
R0A	0.29***	-0.13	0.03**	-0.23**	-0.05	0.05***	-0.34***	-0.44***	5.64%
	(3.08)	(-0.69)	(2.49)	(-2.27)	(-0.94)	(3.71)	(-3.22)	(-6.57)	
MB	1.27***	0.56	0.12	-0.15	-0.84***	-0.21	-1.34***	-3.72***	6.04%
	(3.71)	(1.38)	(1.43)	(-0.22)	(-3.76)	(-1.61)	(-2.91)	(-5.09)	
Listed	0.46***	0.11	0.16***	-0.52	0.40***	0.39***	0.77	1.38***	11.28%
	(2.56)	(0.41)	(4.20)	(-0.79)	(5.74)	(5.78)	(0.74)	(4.08)	

Panel C

	Lead IPO Market Share	*VC-backed*	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	*Tech*	*Adjusted/ Pseudo R^2*
R0A	0.29***	-0.09	0.03*	-0.24**	0.01	0.04***	-0.14	5.46%
	(3.18)	(-0.54)	(1.93)	(-2.25)	(0.01)	(4.05)	(-1.00)	
MB	1.24***	0.81**	0.06	-0.22	-0.36*	-0.23**	-0.34	4.69%
	(3.60)	(1.99)	(0.76)	(-0.33)	(-1.91)	(-2.32)	(-1.04)	
Listed	0.43**	0.10	0.15***	-0.50	0.39	0.37***	0.76	11.20%
	(2.50)	(1.10)	(4.02)	(-1.37)	(1.33)	(4.73)	(0.84)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 8
VC Reputation and Issuer Long-run Performance Measures For
VC-backed IPOs Only

This table presents OLS or logit (as appropriate) regression coefficients and in parentheses the associated *t*-statistics (*z*-statistics) based on standard errors robust to heteroskedasticity and industry clustering. The post-IPO long-run performance measures, *ROA*, *M/B*, or *Listed*, are regressed on *IPO Market Share* VC reputation measure and control variables, using the following specification:

$$P = \beta_0 + \beta_1 \textit{ IPO Market Share} + \beta_2 \textit{ Underwriter Reputation} + \beta_3 \textit{ Bank-VC} + \beta_4 \textit{ Ln Size} + \beta_5 \textit{ Ln Age} + \beta_6 \textit{ Tech} + \varepsilon,$$

where *P* is *ROA*, *M/B*, or *Listed*, and β_0 is a vector of year fixed effects. All other variables are defined in Appendix A. In Panel A, *VC Reputation* represents the VC syndicate and is the average reputation of all the VCs investing in an IPO issuer. In Panel B, *VC Reputation* is based on the lead VC, defined as the VC with the largest issuer investment as of the IPO date. The regressions are estimated for 787, 787, and 822 VC-backed IPOs completed in the period 1996-2002, when the dependant variable is *ROA*, *M/B* and *Listed* respectively.

Panel A

	VC Syndicate IPO Market Share	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	*Tech*	*Adjusted/ Pseudo R^2*
R0A	0.53***	0.01	-0.25	-0.07	0.02	-0.20	4.82%
	(2.56)	(0.14)	(-1.26)	(-0.58)	(0.17)	(-1.44)	
MB	0.90***	0.16	-0.24	-0.86*	-0.84**	0.32	4.49%
	(2.97)	(1.39)	(-1.19)	(-1.79)	(-2.36)	(0.48)	
Listed	1.24**	0.15	-0.72**	0.21	0.23	0.06	5.10%
	(2.48)	(1.55)	(-2.16)	(0.95)	(1.21)	(0.21)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Panel B

	Lead VC IPO Market Share	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	*Tech*	*Adjusted/ Pseudo R^2*
R0A	0.30***	0.00	-0.25**	0.06	0.04***	-0.27*	5.09%
	(2.90)	(0.24)	(-2.45)	(0.64)	(3.49)	(-1.95)	
MB	0.85***	0.12	-0.25	-0.81	-0.83**	0.33	4.82%
	(2.87)	(1.26)	(-1.17)	(-1.76)	(-2.33)	(0.52)	
Listed	0.56***	0.17	-0.68***	-0.10	0.33***	0.09	4.80%
	(3.57)	(1.03)	(-2.81)	(-1.15)	(3.46)	(0.83)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 9
VC Reputation and Post-IPO Firm Growth Characteristics

This table presents coefficient estimates for tobit regressions of VC reputation on IPO firm long term growth measures and in parentheses the associated *t*-statistics based on heteroskedasticity consistent standard errors adjusted for industry clustering. The dependent variables *Y* is either (a) the ratio of research and development expenses to capital expenditures, or (b) the ratio of research and development expenses plus capital expenditures to total assets, both averaged over 3 years following the IPO year. The tobit regression specification is

$$Y = \beta_0 + \beta_1 + \beta_1 \text{ VC Reputation} + \beta_2 \text{ Underwriter Reputation} + \beta_3 \text{ Bank-VC} + \beta_4 \text{ Ln Size} + \beta_5 \text{ Ln Age} + \beta_6 \text{ Ln Asset} + \varepsilon,$$

where β_0 is a vector of year fixed effects, and β_1 is the vector of the 8 industry fixed effects taken from Gompers, Kovner, Lerner, and Scharfstein (2006) to capture VC industry expertise. The definitions of other variables are found in Appendix A. Panel A reports the estimated association of alternative VC syndicate's reputation measures with the ratio of research and development expenses to capital expenditures averaged over 3 years after the IPO year is reported. Panel B reports the estimated association of alternative VC syndicate's reputation measures with the ratio of research and development expenses plus capital expenditure to total assets averaged over 3 years after the IPO year. Panel C presents regression estimates when the lead VC reputation measure, *Lead VC IPO Market Share* is used, where the lead VC is defined as the VC with the largest investment in the issuer as of the IPO date. The regressions are estimated for the 1397 completed IPOs over the 1996-2002 period, where all the necessary data are available.

Panel A

	Dependant Variable: *R&D Expenses / Capital Expenditures*						
	VC Syndicate Reputation Measure	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	*Ln Asset*	*Pseudo R^2*
IPO Market Share	2.71***	3.71**	-0.57	1.69**	1.92	-8.18***	3.70%
	(2.94)	(2.43)	(-0.59)	(2.12)	(0.74)	(-6.21)	
IPO %	0.76***	3.20***	-1.09	2.41**	2.24	-8.15***	3.77%
	(3.75)	(2.08)	(-0.81)	(2.26)	(0.87)	(-6.20)	
IPO Frequency	1.10***	3.41***	-1.06	2.18**	2.07	-8.20***	3.76%
	(3.60)	(2.24)	(-0.81)	(2.22)	(0.80)	(-6.22)	
VC Age	0.94***	3.33***	-1.66	1.50**	1.08	-7.92***	3.73%
	(3.34)	(2.24)	(-1.04)	(2.13)	(0.43)	(-6.23)	
VC Capital	0.01	4.20***	-0.57	1.41**	0.85	-8.82***	3.62%
	(1.37)	(2.85)	(-0.50)	(2.08)	(0.33)	(-6.48)	
VC Total Investment	0.02*	4.03***	-0.93	1.54**	0.86	-8.80***	3.63%
	(1.75)	(2.72)	(-0.53)	(2.11)	(0.34)	(-6.47)	

Panel B

	Dependant Variable: *(R&D Expenses + Capital Expenditures) /Total Assets*						
	VC Syndicate Reputation Measure	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	*Ln Asset*	*Pseudo R^2*
IPO Market Share	0.09***	0.01**	0.05	0.03	0.00	-0.06***	43.30%
	(2.86)	(2.37)	(1.08)	(1.58)	(0.12)	(-6.04)	
IPO %	0.03***	0.01**	0.04	0.03*	0.00	-0.06***	43.97%
	(3.21)	(2.13)	(0.90)	(1.69)	(0.18)	(-6.03)	
IPO Frequency	0.02***	0.01**	0.04	0.03*	0.00	-0.06***	43.91%
	(3.17)	(2.22)	(0.89)	(1.66)	(0.14)	(-6.04)	
VC Age	0.01***	0.01**	0.02	0.03*	-0.00	-0.06***	45.02%
	(3.09)	(2.20)	(0.61)	(1.71)	(-0.02)	(-6.11)	
VC Capital	0.01	0.01***	0.05	0.03	-0.00	-0.06***	42.47%
	(1.63)	(2.70)	(1.17)	(1.55)	(-0.16)	(-6.26)	
VC Total Investment	0.01*	0.01***	0.05	0.03	-0.00	-0.06***	42.59%
	(1.76)	(2.60)	(1.15)	(1.58)	(-0.15)	(-6.26)	

Panel C

	Lead VC IPO Market Share	*Underwriter Reputation*	*Bank-VC*	*Ln Size*	*Ln Age*	*Ln Asset*	*Pseudo R^2*
R&D expenditure/ Capital Expenditure	1.73***	3.68**	-1.19	1.93**	1.89	-8.15***	3.69%
	(2.77)	(2.40)	(-0.64)	(2.17)	(0.73)	(-6.19)	
(R&D + Capital Expenditure) /Total Assets	0.05***	0.01**	0.05	0.03*	0.00	-0.06***	43.45%
	(2.89)	(2.30)	(1.03)	(1.65)	(0.11)	(-6.02)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 10
VC Reputation and IPO Firm Governance Characteristics

Panel A reports the descriptive statistics of five corporate governance characteristics: (a) an indicator variable for VC shareholdings, (b) an indicator variable for VC directors, (c) an indicator variable for a CEO who also holds the board chairmanship (d) an indicator variable for a CEO who is also the founder, and (e) an indicator variable for a staggered board. We track these five governance characteristics at the IPO date and 1, 2 and 3 years after the IPO. The proportion of firms that have each of these 5 governance characteristics are reported for IPO issuers backed by lead VCs with an *IPO Market Share* in the top and bottom quartiles.
In Panel B, these 5 governance characteristics for IPO issuers are regressed against *IPO Market Share*. The logit regression specification is:
$Y = \beta_I + \beta_1 Ln\ Asset + \beta_2 IPO\ Market\ Share + \varepsilon$,
where Y is one of the 5 governance characteristics of the IPO issuers at the IPO date and 1,2, and 3 years after the IPO, β_I is a vector of the 8 industry fixed effects taken from Gompers, Kovner, Lerner, and Scharfstein (2006). The dependent variable *Y* is defined as one of the following five corporate governance characteristics listed above. The table presents regression coefficient estimates and in parentheses the associated *t*-statistics based on heteroskedasticity consistent standard errors adjusted for industry clustering. The definitions of the other variables are found in Appendix A. In the first column of all the panels, the average *IPO Market Share* of the VC syndicate is used as an explanatory variable. In the second column, the *IPO Market Share* of the lead VC (representing the VC with the largest issuer investment as of the IPO date) is used as an explanatory variable. The regressions are estimated for all VC-backed IPOs by US firms completed in the 1996-2002 period, for which we have corporate governance data. The regressions are estimated over 813, 783, 690 and 590 VC-backed IPOs at the time of the IPO, and 1, 2, and 3 years post-IPO respectively.

Panel A

		Top Quartile Lead VC Reputation IPO Market Share	*Bottom Quartile Lead VC Reputation IPO Market Share*
VC Shareholdings	*IPO Year*	1	0.92**
	Post-IPO Year 1	0.94	0.85**
	Post-IPO Year 2	0.79	0.71**
	Post-IPO Year 3	0.71	0.63**
VC Directors	*IPO Year*	0.96	0.83***
	Post-IPO Year 1	0.93	0.78***
	Post-IPO Year 2	0.86	0.77**
	Post-IPO Year 3	0.77	0.68**
CEO - Chairman of Board	*IPO Year*	0.44	0.50*
	Post-IPO Year 1	0.44	0.48*
	Post-IPO Year 2	0.40	0.47**
	Post-IPO Year 3	0.36	0.41*
CEO - Founder	*IPO Year*	0.39	0.48**
	Post-IPO Year 1	0.38	0.45**
	Post-IPO Year 2	0.33	0.40**
	Post-IPO Year 3	0.28	0.34*
Staggered Board	*IPO Year*	0.56	0.55
	Post-IPO Year 1	0.69	0.69
	Post-IPO Year 2	0.72	0.70
	Post-IPO Year 3	0.75	0.71

*, **, and *** denote significantly different from the other cohort at the 10%, 5% and 1% levels respectively.

Panel B

Dependant Variable		*VC Syndicate Reputation IPO Market Share*	*Lead VC Reputation IPO Market Share*
VC Shareholdings	*IPO Year*	0.609***	0.328***
		(3.29)	(4.95)
	Post-IPO Year 1	0.286***	0.272**
		(2.97)	(2.23)
	Post-IPO Year 2	0.189***	0.070**
		(5.22)	(2.38)
	Post-IPO Year 3	0.248***	0.096***
		(3.72)	(3.19)
VC Directors	*IPO Year*	0.390***	0.219***
		(2.73)	(4.10)
	Post-IPO Year 1	0.123**	0.108***
		(2.03)	(2.79)
	Post-IPO Year 2	0.120**	0.104***
		(2.01)	(2.67)
	Post-IPO Year 3	0.337**	0.160***
		(1.98)	(2.59)
CEO - Chairman of Board	*IPO Year*	-0.040	-0.202*
		(-0.16)	(-1.65)
	Post-IPO Year 1	-0.082	-0.210*
		(-0.32)	(-1.66)
	Post-IPO Year 2	-0.067	-0.265*
		(-0.25)	(-1.84)
	Post-IPO Year 3	-0.052	-0.237*
		(-0.18)	(-1.70)
CEO - Founder	*IPO Year*	-0.144	-0.203***
		(-0.56)	(-4.34)
	Post-IPO Year 1	0.017	-0.124***
		(0.06)	(-4.01)
	Post-IPO Year 2	0.001	-0.114***
		(0.00)	(-3.78)
	Post-IPO Year 3	-0.150	-0.151
		(-0.48)	(-1.19)
Staggered Board	*IPO Year*	-0.412*	-0.118
		(-1.64)	(-0.69)
	Post-IPO Year 1	-0.314	-0.083
		(-1.11)	(-0.46)
	Post-IPO Year 2	-0.452	-0.115
		(-1.53)	(-0.97)
	Post-IPO Year 3	-0.385	-0.086
		(-1.15)	(-1.23)

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 11
Long-run IPO Issuer Performance and Corporate Governance
After Controlling for Self-Selection

This table presents second-stage OLS or logit (as appropriate) regression coefficients and in parentheses associated *t*-statistics (*z*-statistics) based on standard errors robust to heteroskedasticity and industry clustering for a two-stage Heckman correction model. Post-IPO long-run performance measures, *ROA*, *M/B*, and *Listed*, are regressed on lead VC's *IPO Market Share*, control variables, and the following 4 corporate governance variables: (a) a count variable for the number of years after the IPO that there are VC directorships (or VC shareholdings), namely 0, 1, 2, or 3, (b) an indicator variable for a CEO-board chairman 3 years after the IPO, (c) an indicator variable for a founder-CEO 3 years after the IPO, and (d) an indicator variable for a staggered board 3 years after the IPO. The specification for the full 2nd stage regression is:

$$P = \beta_0 + \beta_1 + \beta_1 \textit{ VC Governance} + \beta_2 \textit{ CEO-Chairman} + \beta_3 \textit{ CEO-Founder} + \beta_4 \textit{ Staggered Board} + \beta_5 \textit{ Ln Size} + \beta_6 \textit{ Ln Age} + \beta_7 \textit{ IPO Market Share} + \beta_8 \textit{ VC-backed} + \beta_9 \textit{ Underwriter Reputation} + \beta_{10} \textit{ Bank-VC} + \beta_{11} \textit{ Inverse Mills' Ratio} + \varepsilon,$$

where β_0 is the vector of year fixed effects, and β_1 is a vector of 8 industry group fixed effects. In the first specification, we do not include the last 4 control variables, while in the second specification we include all explanatory variables. In a above equation, *VC Governance* represents either *VC Directors* or *VC Shareholdings*. In the first stage logit regression, the likelihood of VC shareholding or VC directorship 3 years after the IPO is regressed on indicator variables for VC shareholdings and VC directorships at the IPO, and on *VC Syndicate Size* and *Revision* as well as a vector of 8 industry group fixed effects. The estimated parameters from this model are used to calculate the inverse Mills' ratio. Other variable definitions are found in Appendix A. Panel A reports the first-stage regression estimates. Panel B and C report the second-stage regression estimates of the shorter version of the above regression equation and the full version, respectively. The regressions are estimated for 1941, 1941, and 2019 IPOs completed in the period 1996-2002, when the dependant variable is *ROA*, *M/B* and *Listed* respectively.

Panel A

	VC Shareholding at IPO	*VC Directorship at IPO*	*Syndicate Size*	*Revision*	*Pseudo R^2*
VC Shareholding 3 years after IPO	5.37***	0.81**	0.03	-0.35	42.65%
	(6.24)	(2.13)	(1.60)	(-1.33)	
VC Directorship 3 years after IPO	1.78	4.41***	0.01	0.18	48.72%
	(1.15)	(2.84)	(0.74)	(0.78)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Panel B

	VC Directors	*CEO – Chair of Board*	*CEO - Founder*	*Staggered Board*	*Ln Size*	*Ln Age*	Inverse Mills' Ratio	*Adjusted/ Pseudo R^2*
R0A	0.42**	-0.04	0.15	-0.18	0.04	0.04	-0.04	7.05%
	(2.40)	(-0.41)	(0.80)	(-0.79)	(1.17)	(0.98)	(-0.67)	
MB	0.54**	-0.32	0.49	0.20	-0.21	-0.20	-0.04	4.43%
	(1.98)	(-0.70)	(1.00)	(0.39)	(-1.34)	(-1.55)	(-0.26)	
Listed	0.28	-0.24	0.82**	0.72**	0.73***	0.42***	0.09	13.85%
	(1.62)	(-0.69)	(1.98)	(2.02)	(7.05)	(5.38)	(0.93)	
	VC Share-holding	*CEO – Chair of Board*	*CEO - Founder*	*Staggered Board*	*Ln Size*	*Ln Age*	Inverse Mills' Ratio	*Adjusted/ Pseudo R^2*
R0A	0.45***	-0.02	0.18	-0.12	0.05	0.04	-0.01	7.22%
	(2.65)	(-0.22)	(0.99)	(-0.52)	(1.49)	(0.99)	(-0.25)	
MB	0.56**	-0.04	0.61	-0.07	-0.23	-0.22**	-0.07	4.92%
	(2.04)	(-0.07)	(0.92)	(-0.10)	(-1.48)	(-2.18)	(-0.52)	
Listed	0.26	-0.22	0.97**	0.79**	0.72***	0.40***	-0.13	13.69%
	(1.33)	(-0.65)	(2.29)	(2.23)	(7.45)	(4.73)	(-1.21)	

Panel C

	VC Directors	*CEO – Chair of Board*	*CEO - Founder*	*Staggered Board*	*Ln Size*	*Ln Age*	*Lead VC IPO Market Share*	*VC-backed*	*Under-writer Reputation*	*Bank-VC*	Inverse Mills' Ratio	*Adjusted/ Pseudo R^2*
R0A	0.44**	-0.04	0.22	-0.17	0.01	0.04	0.25**	-0.57	0.02	-0.22*	-0.10	7.26%
	(2.39)	(-0.37)	(1.09)	(-0.72)	(0.16)	(0.93)	(2.22)	(-0.98)	(0.82)	(-1.92)	(-1.24)	
MB	0.63**	-0.10	0.65	0.38	-0.33*	-0.21**	1.36**	-3.78**	0.07	-0.24	-0.42	5.17%
	(1.96)	(-0.16)	(0.96)	(0.53)	(-1.70)	(-2.09)	(2.26)	(-2.30)	(0.85)	(-0.28)	(-1.57)	
Listed	0.24	-0.33	0.75*	0.57	0.40***	0.38***	0.41*	5.52	0.16***	0.25	1.12	15.07%
	(1.35)	(-0.94)	(1.78)	(1.51)	(2.84)	(4.80)	(1.64)	(1.21)	(3.33)	(0.39)	(1.35)	
	VC Share-holding	*CEO – Chair of Board*	*CEO - Founder*	*Staggered Board*	*Ln Size*	*Ln Age*	*Lead VC IPO Market Share*	*VC-backed*	*Under-writer Reputation*	*Bank-VC*	Inverse Mills' Ratio	*Adjusted/ Pseudo R^2*
R0A	0.47***	-0.01	0.23	-0.13	0.02	0.04	0.26**	0.08	0.02	-0.26**	0.04	7.44%
	(2.69)	(-0.17)	(1.17)	(-0.55)	(0.43)	(0.97)	(2.36)	(0.11)	(0.72)	(-2.18)	(0.30)	
MB	0.57**	0.12	0.81	-0.06	-0.32	-0.23**	1.43**	-2.72	0.06	-0.29	-0.31	5.61%
	(2.02)	(0.19)	(1.19)	(-0.08)	(-1.61)	(-2.28)	(2.41)	(-1.43)	(0.76)	(-0.35)	(-1.15)	
Listed	0.28	-0.35	0.86**	0.68*	0.35**	0.36***	0.49*	4.94	0.18***	0.25	0.81	15.11%
	(1.42)	(-0.99)	(2.01)	(1.86)	(2.53)	(4.60)	(1.73)	(0.93)	(3.72)	(0.37)	(0.87)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 12
VC Reputation and Post-IPO Acquisition Bids and Premiums

Panel A presents logit regression coefficients and in parentheses, associated *z*-statistics based on standard errors robust to heteroskedasticity and industry clustering. An indicator variable for acquisitions of VC-backed issuers in the 3-year post-IPO period, *Acquired*, is regressed on the lead VC's *IPO Market Share*, using the following specification:
$Acquired = \beta_0 + \beta_1\ VC\ Reputation + \beta_2\ Underwriter\ Reputation + \beta_3\ Bank\text{-}VC + \beta_4\ Ln\ Asset + \beta_5\ Ln\ Age + \beta_6\ Tech + \varepsilon$,
where β_0 is a vector of year fixed effects. All other variables are defined in Appendix A. The regressions are estimated for 822 VC-backed IPOs completed in the period 1996-2002. Panel B presents coefficient estimates for OLS regressions of VC reputation on VC-backed IPO firm acquisition premiums in the 3-year period post-issue, and in parentheses *t*-statistics based on heteroskedasticity consistent standard errors adjusted for industry clustering. The dependent variable is *Target Takeover Premium*, the stock price premium paid by the acquirer for the target relative to the target's pre-offer announcement stock price 1 day, 1 week or 4 weeks earlier. Acquisitions must be for share blocks of 5% or greater. When there are multiple acquisitions of blocks of shares involving a target firm in the 3-year post-IPO period, an average target premium and averages of deal related variables are used. The explanatory variables are the lead VC's *IPO Market Share* reputation measure, the log of firm size at the IPO, a vector of industry fixed effects, and 3 acquisition-deal-related variables: the transaction size, the percentage of the shares acquired, a pure cash deal indicator variable and a multiple bidder indicator. The regression specification is:
$Target\ Takeover\ Premium = \beta_I + \beta_1\ Ln\ Asset + \beta_2\ IPO\ Market\ Share + \beta_3\ Ln\ Deal\ Size + \beta_4\ Shares\ Acquired + \beta_5\ Cash + \beta_6\ Multiple\ Bidders + \varepsilon$,
where β_I is the vector of the 8 industry group fixed effects taken from Gompers, Kovner, Lerner, and Scharfstein (2006) to capture VC industry expertise, *Ln Deal Size*, is the natural logarithm of the acquisition's equity purchase price in dollars, *Shares Acquired* is the percentage of target shares purchased in the transaction, *Cash* is an indicator variable for pure cash deals, and *Multiple Bidders* is an indicator variable for competing bidders. The definitions of other variables are found in Appendix A. The regression is estimated for 105 VC-backed IPO issuers made in the 1996-2002 period and acquired in the following 3-year post-IPO period in 134 acquisitions of large blocks of shares, for which data on all the above variables are available.

Panel A

	Lead VC *IPO Market Share*	*Underwriter Reputation*	*Bank-VC*	*Ln Asset*	*Ln Age*	*Tech*	*Psuedo R^2*
Acquired	1.09*	0.28	-0.03*	-0.14	0.51	-0.44	9.11%
	(1.82)	(0.43)	(-1.74)	(-0.35)	(0.97)	(-0.22)	

Panel B

Dependant Variable: Target Takeover Premium	Lead VC *IPO Market Share*	*Ln Asset*	*Ln Deal Size*	*Shares Acquired*	*Cash*	*Multiple Bidders*	*Adjusted R^2*
1 Day before Offer Announcement	11.61***	1.13	3.55**	0.37*	3.05	3.02***	8.01
	(3.12)	(0.55)	(2.43)	(1.67)	(0.17)	(3.62)	
1 Week before Offer Announcement	5.68***	8.64***	4.20	0.33**	20.97**	3.84***	18.37
	(2.56)	(9.26)	(1.63)	(2.27)	(2.38)	(2.80)	
4 Weeks before Offer Announcement	12.93**	9.39	6.88	0.92***	17.88	0.55	21.16
	(2.15)	(0.52)	(1.05)	(4.62)	(1.43)	(0.32)	

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 13
VC Reputation Measures and Future IPO Success

This table presents coefficient estimates for regressions of VC reputation on each VC's number of completed IPOs over the next 3 years, scaled by the average of the number of VC portfolio companies as of the beginning of each of those 3 years. Each VC's *Future IPO Frequency* is regressed on its *IPO Market Share*, a vector of year fixed effects and a vector of 8 industry group fixed effects based on Gompers, Kovner, Lerner, and Scharfstein (2006). Alternatively, we replace year fixed effects with two indicator variables – *Bubble* and *Cold IPO Market* – that take the value of 1 if at least two of the next three years, respectively, span the hot issue 1999-2000 period, or the cold IPO market 2001-2002 period, as documented in Helwege and Liang (2004) and we replace the industry fixed effects, with an indicator variable, *Tech*, which captures a VC's concentration of IPO success in tech firms. A tobit regression specification is used because the dependant variable is constrained to be a non-negative fraction. The dependant variable is the number of completed IPOs over the subsequent 3 years as a proportion of the average number of active portfolio companies a VC is funding, over the 1996-2004 period. The definitions of all the variables are found in Appendix A. In parenthesis, *t*-statistics are reported, which are based on heteroskedasticity consistent standard errors adjusted for industry and year clustering. This regression is estimated for VC-backed IPOs over 10633 VC-years in the 1996-2002 period (comprising 1519 VCs each year).

	Dependent Variable: Future IPO Frequency			
VC Reputation Measure	*Controlling for Year and Industry Fixed Effects*	*Controlling for Bubble & Cold Market Periods & Industry Fixed Effects*	*Controlling for Year & Tech Industry Fixed Effects*	*Controlling for Bubble & Cold Market Periods & Tech Industry*
IPO Market Share	0.377***	0.397***	0.472***	0.495***
	(2.81)	(3.07)	(4.37)	(4.68)
IPO %	0.211*	0.209*	0.224**	0.221**
	(1.75)	(1.69)	(2.13)	(2.05)
IPO Frequency	0.196**	0.195**	0.202***	0.200***
	(2.36)	(2.29)	(2.67)	(2.58)
VC Age	-0.003	-0.003	-0.003	-0.003
	(-1.51)	(-1.60)	(-1.33)	(-1.42)
VC Capital	-0.016	-0.016	-0.014	-0.015
	(-0.90)	(-0.92)	(-0.77)	(-0.80)
VC Total Investment	0.011	0.010	0.009	0.009
	(0.47)	(0.45)	(0.44)	(0.40)

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.

Table 14
Regressions of VC Reputation with Private Equity Network and IPO Characteristics

In this table, the individual VC's private equity network and IPO features are regressed on its *IPO Market Share*, the log of issuer total assets, a vector of year fixed effects, and a vector of 8 industry fixed effects shown by Gompers, Kovner, Lerner, and Scharfstein (2006) to capture VC industry expertise. The regressions are estimated over 822 VC-backed IPOs completed in the 1996-2002 period. The *t*-statistics shown in parentheses are based on heteroskedasticity consistent standard errors adjusted for industry clustering. The dependent variable *Y* is alternatively as the *Underwriter Reputation*, *Top Law*, *Top Auditor*, *Registration Period*, *Hot IPO*, *Hot Issue Market*, *VC Syndicate Size* or *Shares Offered*, defined respectively as the Carter-Manaster underwriter reputation measure and indicators for IPO issuers with a top tier legal advisor and IPO issuers with a top 4 accounting firm, the length of the registration period from filing date to IPO, two indicators for IPOs where offer price is higher than the midpoint of the initial filing range and IPOs made in the Helwege and Liang (2004) hot issue market periods, the number of VC co-investors in the IPO issuer at the time of the IPO, and the number of primary shares sold relative to pre-IPO shares outstanding. The regression specification is

$Y = \beta_0 + \beta_1 + \beta_1 \, Ln\ Asset + \beta_2 \, IPO\ Market\ Share + \varepsilon,$

where β_0 is a vector of year fixed effects and β_1 is a vector of 8 industry fixed effects. When the dependant variable is *Top Law*, *Top Auditor*, *Hot IPO* or *Hot Issue Market*, a logit regression specification is used. When the dependant variable is *Underwriter Reputation*, *Registration Period*, *VC Syndicate Size* or *Shares Offered*, a tobit regression specification is used. The definitions of other variables are found in Appendix A. In panel A, the estimated associations of VC network variables with both VC Syndicate and Lead VC *IPO Market Share* reputation measures are reported. In panel B, the estimated associations of issue quality and IPO demand with both VC Syndicate and Lead VC *IPO Market Share* reputation measures are reported. The regressions are estimated over 822 VC-backed IPOs completed in the 1996-2002 period

Panel A

	Underwriter Reputation	*Top Law*	*Top Auditor*	*VC Syndicate Size*
VC Syndicate IPO Market Share	0.49***	0.49*	0.62*	*N/A*
	(3.77)	(1.64)	(1.77)	
Ln Asset	0.41***	0.13	-0.01	
	(10.95)	(1.37)	(-0.12)	
Lead VC IPO Market Share	0.29***	0.45***	0.42**	0.62**
	(4.21)	(2.62)	(2.13)	(2.28)
Ln Asset	0.41***	0.13	-0.01	0.18
	(11.04)	(1.37)	(-0.12)	(1.29)

Panel B

	Registration Period	*Hot Issue Market*	*Hot IPO*	*Shares Offered*
VC Syndicate IPO Market Share	-15.15**	-0.54*	0.36**	0.11
	(-2.22)	(-1.92)	(1.98)	(0.60)
Ln Asset	-8.11***	-0.05	0.88***	0.12
	(-4.15)	(-0.44)	(8.41)	(0.24)
Lead VC IPO Market Share	-12.05***	-0.37*	0.24**	0.20**
	(-3.30)	(-1.87)	(2.50)	(2.07)
Ln Asset	-8.12***	-0.06	0.88***	0.10
	(-4.17)	(-0.59)	(8.43)	(0.19)

*, **, and *** denote coefficient estimates significantly different from zero at the 10%, 5% and 1% levels respectively.