Venture Capital Conflicts of Interest: Evidence from Acquisitions of Venture Backed Targets

Ronald W. Masulis
Owen Graduate School of Management
Vanderbilt University
401 21st Avenue South
Nashville TN 37203
ronald.masulis@owen.vanderbilt.edu
(615) 322-3687

Rajarishi Nahata
Baruch College, CUNY
Box B10-225
One Bernard Baruch Way
New York, NY 10010
raj_nahata@baruch.cuny.edu
(646) 312-3473

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Abstract: We study the relation between venture capital (VC) backing and the profitability of privately held firm acquisitions. Controlling for endogeneity in venture funding, we document that acquisitions of VC-backed targets lead to significantly higher acquirer announcement returns than non VC-backed acquisitions. Acquirer announcement returns are also substantially larger when the acquisitions are equity financed. We evaluate five hypotheses, four of which pertain to various VC conflicts of interest with other investors, to explain the cross section of acquirer announcement returns and target purchase price-to-book value ratios. We find evidence that higher acquirer returns and lower target purchase price-to-book value ratios are in part caused by liquidity pressures on VC funds nearing their termination dates. Acquisitions of targets backed by VCs with close financial ties to the acquirers have significantly higher acquirer announcement returns and lower target purchase price-to-book value ratios. This evidence is consistent with a VC moral hazard problem where VC incentives to obtain higher target purchase prices are compromised by their dual financial relationships. Corporate venture capitalists (CVC) have strategic as well as financial goals, which create conflicts with other venture investors. Consistent with CVC conflicts of interest, acquisitions of firms backed by CVCs exhibit higher acquirer stock returns. We also uncover evidence that the shifting strategic objectives of CVC parents and their weak commitment to the VC market lead to rapid exits from their VC portfolio firms and higher wealth gains for acquiring firms. In summary, we find support for several hypotheses concerning VC conflicts of interests with other investors for explaining higher acquirer announcement returns when targets are VC-backed.

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Introduction

Acquisitions of public firms commonly trigger negative announcement effects for acquirer shares when financed with common stock and negligible announcement effects when financed with cash (Andrade, Mitchell and Stafford (2001))[1]. In contrast, several studies of acquisitions of privately held firms report positive acquirer announcements effects, which are larger when financed with common stock.[2] Furthermore, a recent study of European acquisitions reports that these acquirer announcement patterns have persisted through time and across countries.[3] Thus, the profitability of private firm acquisitions spans a variety of institutional features and regulatory regimes that vary across Anglo-European countries. Existing evidence suggests a need to investigate the fundamental factors that determine the profitability of private firm acquisitions.

Venture capitalists (VCs) have a major presence in the private equity market and they often hold important decision making or control rights in the private firms in which they invest. VC investors can also have very different incentives from those of other investors in privately held firms, as we explain below. Yet, the impact of VC investors on the private firm acquisition process is not well understood. This leads us to investigate the relation between the profitability of private firm acquisitions and VC investor characteristics. We first investigate whether VC backing can explain the higher announcement returns observed in private firm acquisitions, after taking into account both the acquisition financing choice and the endogeneity in VC backing. After documenting that acquisitions of VC-backed firms lead to substantially higher acquirer announcement returns, we go on to examine whether there are also differences in target purchase price to book value ratios as a proxy for the size of takeover premiums. In the course of this analysis, we examine the empirical importance of various conflicts of interest that arise between different classes of VC investors and other investors in privately held firms, which might explain our basic findings.

First, VCs face increased liquidity pressure to exit investments as their *funds* approach maturity. This can make VCs in more *mature funds* nearing liquidation more impatient to complete acquisitions, which leads them to pressure target management to sell more quickly, even if it involves accepting a lower purchase price. Such impatience by more mature funds is

[1] For more empirical evidence, see Travlos (1987), Wansley, Lane and Yang (1987), Servaes (1991) and Moeller, Schlingemann and Stulz (2004).
[2] See Hansen and Lott (1996), Chang (1998), Faccio et al (2006) and Fuller, Netter and Stegemoller (2002).
[3] See the study by Faccio, McConnell and Stolin (2006).

likely to lead to higher acquirer returns. In contrast, we expect acquisitions of targets backed by *younger funds* facing less liquidity pressure to fetch lower acquirer returns and higher acquisition prices**.** We label this the *'VC liquidity'* hypothesis.

Second, young VCs are under strong pressure to establish a successful track record in venture investing to support their next round of fund raising, which generally occurs in the third to fifth year of the prior fund's life. Without a strong record of venture investment success it is very time consuming and costly to raise capital for a new fund. Thus, these younger, less experienced VCs can willingly sacrifice higher acquisition prices to obtain profitable exits sooner, which can raise acquirer returns. This set of conditions leads to predictions of lower (higher) expected target purchase prices and higher (lower) acquirer stock price gains when privately held targets are backed by less (more) experienced VCs. We call this the *'VC grandstanding'* hypothesis (Gompers(1996)).

Third, a VC moral hazard problem can arise when VCs have financial relationships with acquirers as well as targets. This is a particular concern because VCs typically have strong control rights in their portfolio companies, which substantially exceed their cash flow rights (Kaplan and Stromberg (2003)). Since an acquirer is made financially better off by a lower purchase price, and a typical VC holds a small fraction of its portfolio firm's equity, a conflicted VC can gain financially from supporting the acquirer in negotiations with its portfolio firm, even though the VC sustains a lower gain on its target investment. This financial situation could cause a VC to pressure its portfolio firms to sell more quickly and to give them less support in acquisition negotiations, thereby undermining target managements' efforts to realize higher acquisition prices. It follows that a financial relationship between a VC and an acquirer lowers the expected target purchase price and raises the expected acquirer announcement effect. We call this the '*VC moral hazard'* hypothesis.

Fourth, corporate venture capitalists (CVCs) are important recent entrants in the private equity market and as such are relatively inexperienced.[4] CVCs also differ from traditional venture capitalists (TVCs) in that their primary incentive for investing is to realize strategic benefits for their parent corporations. CVCs often make venture investments to understand or acquire new technologies and to nurture rapid commercialization of products and technologies that complement those of CVC parent corporations. Thus, CVCs can support acquisition decisions that do not maximize portfolio firm financial returns. Furthermore, due

[4] At its peak in 1999-2000, the CVC share of total venture investment rose to nearly 20%, though it has since shown a sharp decline.

to their inexperience, some CVCs and their parent boards of directors can be impatient to harvest their investments, especially in the face of weakening economic conditions, which can result in premature exits from their ventures.[5] When bidding for target firms, acquirers are likely to take into account a CVC's inexperience and its strategic objectives, which can be in conflict with maximizing a target's financial gain. This gives acquirers a negotiating advantage, which can translate into lower expected target purchase prices and higher expected acquirer announcement returns. We call this effect the *'CVC strategic focus'* hypothesis.

Finally, the acquisition financing choice can reveal information about an acquirer's financial condition. Announcements of *stock financed* acquisitions can lead to positive revisions in acquirer share prices since the market knows that target owners obtain access to proprietary acquirer information when stock financing is being considered. So acceptance of acquirer stock as acquisition currency releases positive information to the market about acquirer share values. The use of cash financing on the other hand is likely to release negative information about the acquirer following similar logic. While this effect is predicted to occur whether or not a VC is involved, the information effect could be larger given the financial sophistication of a typical VC. This effect is also likely to be larger when there is greater information asymmetry about an acquirer stock's market value. We call this effect the '*VC acquisition currency'* hypothesis.[6]

Next, we briefly preview our results. First, we find some evidence supporting the *VC liquidity* hypothesis when we distinguish VC funds based on a fund's closing date. We find that when VC funds are far from liquidation, acquirers of targets backed by such VC funds receive significantly higher purchase prices relative to their book values. This is consistent with VC funds closer to liquidation exerting substantial pressure on target management to accept lower sale prices, so as to insure profitable exits in a timely manner. However, whether we use a measure of VC fund age or an indicator for funds far from liquidation, these variables are not statistically significant determinants of acquirer announcement returns.

Second, we find weak support for the *VC grandstanding* hypothesis which predicts more rapid exits for younger, less experienced VCs. Targets backed by these VC firms are expected to experience higher acquirer announcement returns and lower purchase price to book value ratios.

[5] At the peak of the bubble in 2000, some 450 corporations launched VC units. More than 100 of those units are no longer active, including those at British Airways, Compaq Computer, Marconi, and the Vodafone Group. Of the remainder, it is suggested that another 100 or so would love to wash their hands clean of the whole experience. (Source: http://www.myneweconomy.com/articles/291102/VENTURE.htm)

[6] The stock price reaction to announcements of private placements of equity is on average 4.4 percent. Consistent with the information hypothesis, there is evidence that abnormal returns reflect favorable inside information about the firm, (see Hertzel and Smith (1993)).

We observe that acquisitions of portfolio firms backed by less experienced VCs on average have higher acquirer announcement returns than other VC backed targets, though the difference is not statistically significant. The portfolio firms of less experienced VCs also have lower purchase price to book value ratios, though again these differences are not statistically significant. This evidence suggests that the VC grandstanding effect is less important in the acquisition market than it is in the IPO market. This is consistent with the fact that acquisitions are less profitable exits than IPOs, and thus, are less valuable to young VCs in establishing a positive track record.

Third, we find strong support for the *VC moral hazard* hypothesis. In particular, acquisitions of targets backed by VC firms that have direct financial ties to acquirers exhibit significantly higher acquirer announcement returns. Further, when such relationships exist, the purchase prices received by targets relative to their book values are on average significantly lower. This evidence is consistent with a VC conflict of interest with portfolio firm investors, which compromises a VC's incentives to support aggressive negotiations by the target for a higher acquisition price.

Fourth, consistent with the *CVC strategic focus* hypothesis, we show that acquisitions of CVC backed targets lead to higher acquirer announcement returns compared to targets that are not backed by corporate investors. In our analysis, we find that nearly 95% of CVC investments in our sample are strategic in nature. As a further test of the *CVC strategic focus* hypothesis we examine the average investment profiles of CVCs and TVCs in the years surrounding acquisitions of their portfolio companies. Several studies report that CVC parents appear to rapidly shift strategies as market conditions change or CVC financial performance does not quickly meet parent firm expectations.[7] If CVC parent's commitment to venture investing waxes and wanes, then an acquisition of one portfolio firm, which is often the only feasible way to quickly and profitably exit from a VC investment, can signal a reduced commitment to VC investing by the CVC's parent. Thus, we expect CVC venture investment levels in the post-acquisition years to more frequently fall relative to TVC levels.

Since the acquisition exit decision can also be influenced by hot and cold market conditions, the comparison of CVC and TVC investment decisions has the added benefit of controlling for the influences of general market conditions. Post-acquisition, we find that nearly 60% of CVCs reduce their portfolio investments, while only 41% of TVCs reduce their investments in this period. Finally, there is a significantly positive correlation between acquirer

[7] Burgelman and Valikangas (2005), Dushnitsky and Lenox (2006) and Gompers and Lerrner (2000) discuss major changes in venture investment activity by CVCs.

announcement returns and an indicator denoting reduced post-acquisition CVC investment. This evidence supports the hypothesis that CVCs are strategically focused and that their parents' strategic objectives can abruptly change, resulting in a rapid reduction in their venture investment levels and pressure to exit from their portfolio firms when faced with reduced future VC funding.

Fifth, we also examine whether VC funding combined with equity financing reveals positive information to investors about the financial condition of the acquirer and the market value of its stock, which we label the *VC acquisition currency* hypothesis. Since selling VC investors can obtain proprietary information about the acquirer in the course of the acquisition negotiations, their willingness to accept acquirer stock as payment for their holdings in a target can be viewed by the market as positive information about acquirer stock value. We find that for both VC-backed and non VC-backed targets, acquirer announcement returns are higher for stock financed acquisitions compared to cash financed acquisitions. We also observe that the difference is larger for VC-backed acquisitions, though it is not statistically significant. This evidence is weakly consistent with the *VC acquisition currency* hypothesis.

In summary, we document a large body of evidence that is consistent with VC conflicts of interest with entrepreneurs and other portfolio firm investors, which affect the profitability of acquisitions for acquirers and targets. Specifically, we find strong support for the predictions of the *VC moral hazard* hypothesis and some support for the *VC liquidity and CVC strategic focus* hypotheses. We also find evidence of *VC grandstanding* behavior, which is predicted to lead to higher acquirer CARs and lower target purchase price to book value ratios. However this effect is not statistically significant.

In our analysis of VC-backed and non VC-backed targets, we employ the propensity score technique with a matched pair procedure to compare the acquisition announcement effects, measured by acquirer cumulative abnormal returns (CARs) and target purchase price-to-book value ratios. The propensity score technique ensures a close match between VC-backed and non-VC-backed targets across multiple criteria and reduces endogeneity concerns arising from the non-random nature of VC investing. A major advantage of the propensity score method is that it uses multivariate analysis to simultaneously control for several relevant deal characteristics. In this approach, propensity scores are used to choose a matched sample that is most like the VC-backed sample across a selected set of deal characteristics considered important to the analysis.[8]

[8] Recent studies using propensity score matching include Lee and Wahal (2004) and Villalonga (2004).

The contributions of this study are four-fold. First, it is well known that VCs generally realize higher returns on their investments when their portfolio companies either undertake initial public offerings (IPOs) or are acquired. However, the extant literature has largely focused on the IPO exit, even though approximately 20% of VC investments result in acquisitions.[9] We help fill this gap by examining acquisitions of VC backed private firms in the U.S over the 1991 – 2001 period. Second, this study sheds new light on the private firm acquisition market, which in recent years represents nearly 70 percent of total acquisition activity in the U.S.[10] Third, after matching private targets on various deal-specific and firm-specific characteristics, we document that purchases of VC backed firms are associated with significantly higher acquirer announcement returns than similar non VC-backed acquisitions. Fourth, we analyze various conflicts of interest between VC and other target investors and test for their effects on acquirer announcement returns when targets are VC backed. Consistent with a number of these VC conflict of interest hypotheses, we uncover distinctly different acquirer wealth effects, conditional on the presence and type of venture investor involved.

The remainder of the paper is organized as follows. The next section develops the hypotheses contrasting acquisition announcement effects for VC-backed and non-VC-backed targets. Section III contains the sample selection criteria, description of the matching technique and descriptive statistics contrasting VC-backed and non VC-backed targets. Multivariate analysis of cumulative abnormal returns to the acquirers of VC-backed and non VC-backed targets follow in section IV. Section V investigates deeper into venture capital specific characteristics of VC-backed targets and presents additional tests to explain the higher acquirer returns associated with these acquisitions. Section VI describes some robustness checks. Section VII concludes.

II. Hypotheses

IPOs and acquisitions are the two most profitable exits available to venture capitalists and largely responsible for VCs' reputation and success (Gompers and Lerner (2001)). While IPOs are viewed as the most profitable VC exit, there are times when acquisitions could be very profitable especially, in periods when the IPO market is weak or effectively closed.

[9] See Barry et. al. (1990), Brav and Gompers (1997), Gompers and Lerner (2001), Hochberg (2005), Lerner (1994b) and Megginson and Weiss (1991) for studies on VC backed IPOs. Cochrane (2005) and Peng (2002) present statistics on VC investments.
[10] Statistics from the SDC Platinum's M&A Database (1996-2002)

VCs face liquidity pressure to exit their investments as their fund approaches maturity. VC partnerships must typically liquidate at the end of 10 years and are prohibited from reinvesting their profits.[11] Since the VC general partner is judged on the rate of return a fund realizes on capital under management, the sooner this capital is returned to its limited partners, the shorter is the period over which a return is measured and thus, the higher is the fund's rate of return. This can make VCs more impatient about completing acquisitions. Further, when VC funds are nearing maturity, the need for liquidity intensifies as its remaining portfolio firms continue to require additional capital for R&D, capital expenditures and to cover current losses, while the unallocated capital remaining in the VC funds is rapidly diminishing. This can motivate VCs to pressure their successful portfolio firms to sellout. Thus, these VC backed targets can face pressure to accept lower sale prices to ensure that the VCs realize successful exits in a timely manner. Since acquirers are aware of these pressures, they are likely to lower their bids accordingly, enabling acquirer stockholders to realize higher acquisition gains. This yields the prediction that acquisition announcements of firms backed by VC funds nearer to (farther from) maturity should be associated with lower (higher) purchase prices and higher (lower) acquirer stock returns. We label this H1: the '*VC liquidity*' hypothesis.

Second, experienced VCs develop extensive professional and social networks encompassing other VCs, public and private companies, commercial and investment banks, auditors, lawyers, etc. With each new investment a VC undertakes and with each new VC syndicate it joins (Lerner (1994a)) the VC's network is enhanced and this expanding network can have positive implications for a VC's investment performance (Hochberg et al (2006)).[12] Lindsey (2004) provides empirical support for the VC 'keiretsu' phenomenon by analyzing joint ventures and strategic alliances among VC portfolio companies and finds a higher incidence of collaboration among VC portfolio firms. It follows that more experienced VCs with a wider network of contacts are able to contact a larger pool of potential acquirers, which increases the

[11] However these funds do have the ability to extend their lives for several more years with limited partner approval.

[12] For example, Kleiner Perkins Caufield and Byers, probably the best known VC management firm notes: "Kleiner Perkins Caufield and Byers is passionately committed to helping our portfolio companies succeed. We know that it takes more than sold financial support to get a company off the ground – we help make things happen. We deeply believe that teams win. Entrepreneurs gain access to our unmatched portfolio of companies and associations with global business leaders. These relationships are the foundations for strategic alliances, partnership opportunities, and the sharing of insights to help build new ventures faster, broader and with less risk. Think of it as relationship and venture capital."

likelihood of competing bids for target firms. These VCs also have experience selling private firms and can offer valuable advice to their portfolio firms in their negotiations with potential buyers. Thus, acquirers of targets backed by more experienced VCs are expected to pay higher target purchase prices and realize lower shareholder wealth gains. In contrast, less experienced VCs realize greater benefits from profitable early exits, as argued by Gompers (1996), albeit in the context of IPO exits. This motivates inexperienced VCs to push their portfolio firms to sell out earlier, even though this may sacrifice a higher purchase price that more extended negotiations would generate. We call this H2: the '*VC grandstanding*' hypothesis.

Third, VCs' extensive network of private equity contacts can be helpful in locating potential acquirers. However, when a VC has existing financial relationships with both an acquirer and target, a potential moral hazard problem is created. Specifically, during acquisition negotiations, dual financial relationships can result in a VC conflict of interest with target entrepreneurs and other outside investors. Since an acquirer is financially better off with a lower target purchase price, this can also lower a VC's incentive to support target management in negotiations with potential acquirers. A potential acquirer is also likely to lower its bid given that it knows about the VC's dual financial relationships. This situation can lead to a lower target purchase price and a higher acquirer announcement return. We call this H3: the '*VC moral hazard*' hypothesis.

Fourth, we recognize the heterogeneity of VC investors by distinguishing between TVCs and CVCs, observing that corporate venture investors have both strategic and financial objectives. In a survey of CVCs, Yost and Devlin (1993) report that 93% of respondents considered realizing strategic benefits a major goal of their investment decision and achieving synergies with their parents' core businesses as their prime objective. CVC strategic benefits can include acquiring new technologies and nurturing the rapid commercialization of technologies that complement CVC parent corporations' products and services. Having two goals creates a conflict of interest between the CVC and the other portfolio firm investors who invest primarily to reap financial benefits. For example, once a CVC's parent learns enough about a portfolio company's new technology and promise, the CVC can seek to rapidly exit from a particular venture investment. Alternatively, a CVC might accept lower acquisition prices to accelerate the commercialization of target firms' technologies, which benefits a CVC parent corporation. These concerns create incentives for CVCs to rapidly exit from particular portfolio companies. More generally, having a dominant strategic objective creates several other problems. CEO turnover at CVC's parent, a fall in parent profitability, a major reduction

in the parent's overall investment activity, or a short term financial loss from parent's venture investments can cause a CVC parent to demand a major retrenchment from the VC market. Also, CVC parents are often relatively inexperienced players in the private equity market and their boards of directors may not completely understand the high level of risk that venture investing entails.[13] Thus, a board can quickly become alarmed by poor short run performance in a CVC's venture portfolio and lose faith in the CVC officers. Given that many CVCs are controlled by inexperienced parent corporations, CVCs can display impatience in harvesting their investments, often resulting in premature exits from their venture investments.[14] More importantly, acquirers are likely to factor into their bids CVCs' strategic focus, their impatience and inexperience, thus reducing their offer prices and raising acquirer announcement returns. We call this H4: the '*CVC strategic focus*' hypothesis.

Finally, announcements of *stock financed* acquisitions of VC-backed private firms can positively affect acquirer share prices. In public firm acquisitions, the average negative acquirer return to stock financed acquisition announcements can be attributed to the asymmetric information problem of Myers and Majluf (1984). In their model, an acquirer's management offers stock when they believe their own stock is overvalued. Hence, the market reaction to announcements of stock financed acquisitions of publicly held targets is on average negative.[15] In private firm acquisitions, the asymmetric information problem can be mitigated since the acquirer privately discloses proprietary financial information to target principals, including its VCs. When sophisticated private investors such as VCs willingly accept large blocks of acquirer shares, this action can convey favorable information to the market about these acquirers, resulting in positive stock price reactions to these VC-backed acquisition announcements.[16] This effect is different from stock financed public firm acquisitions since

[13] See Burgelman and Valikangas (2005), Dushnitsky and Lenox (2006) and Gompers and Lerrner (2000) for further discussions of the reasons for the abrupt changes in corporate strategies and policies toward venture capital investing.

[14] "Venture Capital, Without the Risk": Boeing's venture arm is in a tailspin. Dell's has gone blue screen. Applied Materials Ventures has short-circuited. These are just three of a growing number of corporations abandoning or severely curtailing the corporate venture capital investments that emerged in the late 1990s. The recent departures follow the likes of EDS, Hewlett-Packard, Bechtel, British Airways, Quantum, and AT&T, all companies that exited the market after their bubble-era investments failed to yield the expected financial or strategic returns. (Source: Red Herring Magazine, March 28, 2005 Issue)

[15] For example see the arguments in Travlos (1987).

[16] Chang (1998) also suggests that favorable information about acquirer stock values may be realized when, after thorough due diligence investigations, targets accept acquirer stock as M&A consideration. This positive signaling effect can also contribute to higher acquirer returns in stock financed acquisitions. The creation of sophisticated blockholders like venture capitalists also leads to monitoring benefits, since VCs have incentives to get involved in management and monitoring of the firm. See Chang (1998) and Barclay et al (2002).

the sellers include sophisticated investors with access to proprietary acquirer information and are better able to evaluate the value of acquirer stock than ordinary target shareholders. Likewise, a cash financed acquisition can indicate reluctance on the part of VCs and other target investors to accept acquirer stock as M&A currency. As a result, this can be interpreted as a negative signal by the market. We call this effect H5: the '*VC acquisition currency*' hypothesis.

III. Data, Sample Selection and Descriptive Statistics

Data

We obtain a sample of completed acquisitions involving domestic private targets for whom initial bids were announced between January 1, 1991 and December 31, 2001 from Thomson Financial's Mergers and Acquisitions (M&A) and VentureXpert databases. To be included in the sample, the following conditions must be satisfied:

1. Acquirers are U.S. headquartered and their stock is publicly listed on the AMEX, NASDAQ or NYSE.
2. The target is a privately held US incorporated company.
3. Neither acquirer nor target is a regulated utility or a financial institution.
4. The acquisition must be completed and prior to the deal announcement the buyer has no publicly known toe-hold position and on deal completion it acquires 100 percent of the target firm shares.
5. The target purchase price is at least one million dollars and the relative deal size (target purchase price divided by acquirer equity market value one month prior to the deal announcement) is at least 10%.
6. Acquirer stock returns are available in the CRSP database and its daily returns are available for the five trading days surrounding the acquisition announcement date (event days -2 to 2).
7. Acquirer stock prices must be at least two dollars as of the acquisition announcement date (event day 0).
8. VC-backed targets must have information available on the investment positions of one or more of its VC investors.
9. Clustered acquisitions (of two or more) by a single acquirer within five days are excluded.

In our analysis, acquisitions of subsidiaries and public firms are excluded since our primary interest is in analyzing the impact of VC backing on acquisitions of private companies. According to the VentureXpert database, in the 1991 – 2001 period more than 97% of acquisitions of privately held VC-backed targets involve acquirers purchasing 100 percent of a target's equity where no prior toeholds existed. Since market anticipation can reduce observed announcement effects, we exclude toeholds from our sample to minimize the anticipatory effects on acquisition wealth gains (or losses).[17] We exclude partial acquisitions because the economic benefits of the acquisition are more difficult for the market to assess. Estimating bidder announcement returns presents several difficulties (See Eckbo, Maksimovic, and Williams (1990) for a more thorough discussion). In particular, targets may be small relative to buyer equity values, so even very profitable acquisitions can have little impact on buyer stock prices. Thus, we require a minimum relative deal size of at least 10%.[18] To avoid bid-ask bias in announcement period abnormal returns, we exclude deals where an acquirer's stock price is below two dollars.[19] We exclude acquisitions by a single bidder closely clustered in calendar time since we cannot isolate the announcement effects of the individual acquisitions. These sample criteria result in a VC-backed target sample of 229 completed deals and a non VC-backed sample of 2114 completed deals.

Table 1 reports descriptive statistics for our acquisition samples of 229 VC-backed and 2114 non VC-backed target firms. Panel A reports the differences in firm characteristics across the two acquisition samples using a standard t-test for a difference in means as well as a Wilcoxon test for difference in medians. In general, VC-backed targets are likely to be three times larger in total assets compared to non VC-backed targets, where the difference is statistically significant at the 1% level. A similar pattern is observed for acquirers as well; the mean (median) total assets of acquirers of VC-backed targets is $828 ($211) million, which is significantly larger than the mean (median) total assets of acquirers for non-VC-backed targets of $268 ($70) million. This indicates that the targets and their acquirers are substantially different across the two samples.

[17] Acharya (1988, 1993) and Eckbo, Maksimovic, and Williams (1990) argue that it is the unexpected portion of a news release that should determine the stock price reaction to the event, if we are to avoid endogeneity problem associated with the voluntary nature of announcement.

[18] Most acquisitions are reported to the SEC as 8K filings. SEC rules do not require target financials to be reported unless the acquisition is at least 10% of an acquirer's value. Since we collect target-specific information from SEC filings, we impose this same requirement on our acquisition sample. Other papers that study private targets (Poulsen and Stegemoller (2006)) also impose this cut-off, particularly when analyzing financial information.

[19] The results remain unchanged if we impose a five dollar stock price requirement.

Panel B of Table 1 reports the frequency of acquisition financing methods for the two samples. Acquisitions of VC-backed targets are predominantly (80%) financed with stock or a mixture of cash and stock. In contrast, only 53% of non VC-backed acquisitions involve stock as the acquisition currency. Finally, as reported in Panel C, nearly 69% of VC-backed targets belong to technology intensive industries such as biological products, pharmaceuticals, genetics, high-tech communications, communication services, software services, electronic equipment and computers. In stark contrast, only 24% of non-VC-backed targets are in the technology intensive sectors. Thus, deals involving VC-backed targets have substantially different properties from other private firm acquisitions, in terms of target and acquirer size, type of financing and industries. This raises some important concerns about a selection bias that need to be addressed in any statistical analysis.

Sample Matching and Selection

To evaluate the effects of VC-backing on acquisition profitability, we must first create a comparable sample of non VC-backed acquisitions to help minimize any inherent selection bias across the samples. We use the propensity score method to create matching non VC-backed acquisitions for our VC-backed acquisition sample. Propensity score matching methods are useful when matching is based on multiple characteristics. In this approach, propensity scores are used to select 'control' units that are most like the 'treatment' units across a variety of characteristics considered important to the analysis (Dehejia and Wahba, 2002).[20] A notable feature of the method is that once the samples are matched, the remaining unmatched comparison sample is discarded, and is not directly used in estimating the treatment impact. This contrasts with other approaches that use the full control sample to estimate the treatment impact, such as the Heckman, Ichimura, and Todd's (1997) kernel-based matching estimator. Approaches such as Heckman's two-stage model which use the full set of control firms can result in biased estimates of the treatment impact when non-comparable control firms are included. The extent of this bias depends on the comparability of 'treatment' and 'control' firms. The more comparable the samples are across the relevant characteristics, the less biased are the estimates based on OLS or the two-stage least squares estimation method. Given the need to control for several characteristics, the propensity score matching method has attractive properties for selecting the most relevant comparison group.

[20] 'Treatment' and 'Control' units for the purpose of this analysis and subsequent discussion are VC-backed and non-VC-backed targets respectively.

The propensity score technique is employed in several recent studies in corporate finance.[21] For example, Lee and Wahal (2004) use propensity score methods to examine the role of venture capital backing in the underpricing of IPOs. They use the propensity scores to control for endogeneity in the receipt of venture funding, and find that venture capital backed IPOs experience *larger* first-day returns than comparable non-venture backed IPOs. In our study, we use the propensity score method to match samples since VC-backed firms are likely to have characteristics that are atypical of the overall population of privately held firms because of the specialized nature of VC investment criteria, such as high growth potential and a shorter expected investment period before an IPO or acquisition exit.

To implement the propensity score method, we first estimate a logistic regression to predict whether an acquisition target is VC-backed or non-VC-backed. Our regression model includes as predictive variables a high-technology indicator (software services, electronic equipment, computers, communication services, high-tech communications, biological products, pharmaceuticals and genetics are classified as high-tech industries), a method-of-payment indicator (cash versus common stock), deal size (target purchase price), and relative deal size (target purchase price divided by acquirer's equity capitalization). The motivation for choosing these variables is discussed below. The dependent variable in the logistic model is equal to 1 if the target is VC-backed and is 0 otherwise.

The first matching criterion controls for industry patterns in VC-investing, since VCs focus largely on technology rich firms in select industries such as computers, software services, electronic equipment, high-tech communications, communication services, biological products, pharmaceuticals and genetics. The second matching criterion controls for the fact that bidder returns are higher when acquisitions are funded by stock (Chang, 1998). The third matching criterion ensures that target firms are matched as closely as possible in terms of their purchase prices. Finally, relative size attempts to account for the economic significance of the acquisition to the acquirer share value. It also controls for the empirical relationship between a target's relative size increases and the impact on an acquirer's stock value. [22]

Since the 'control' sample (non-VC-backed targets) contains a much larger number of observations than the 'treatment' sample (VC-backed targets), the parameter estimates from a logistic regression model that uses the entire sample are likely to be poor. It is possible to obtain better coefficient estimates by stratifying the samples, particularly the 'control' sample. However,

[21] See Hogan and Lewis (2004), Lee and Wahal (2004), Li and Zhao (2005) and Villalonga (2004)

[22] Prior research by Fuller et al (2002) and others document a significant relation between relative deal size and acquirer returns.

the stratified sampling approach over-samples the 'treatment' firms relative to the 'control' firms. This may result in biased maximum likelihood estimates. Manski and Lerman (1977) develop a method to correct for this bias by weighting the likelihood function of each observation by Q(i) / H(i) where for our study, Q(i) is the fraction of the total sample that select outcome i, where i is either a VC-backed or a non-VC-backed target and H(i) is the corresponding fraction in the stratified sample. We estimate the logistic model by selecting a stratified sample of 200 VC-backed and non-VC-backed targets from each cohort.

Rather than relying on results from a logistic model that assumes normally distributed errors, we estimate the model parameters using *bootstrapping*, which makes no distributional assumptions on the error structure. Specifically, we draw 1000 stratified samples and estimate a separate logistic regression for each sample-pair. The resulting sample of bootstrapped parameter estimates represents the sampling distribution of the estimators. The estimated likelihood of a VC-backed target based on the logistic regression estimates is (p-values based on bootstrapped coefficient estimates and standard errors are in parentheses) as follows. [23]

-3.817 + 1.8989 (High-tech)	+ 0.698 (Stock)	+ 0.0014 (Deal size)	– 0.067 (Relative deal size)	
(<0.01) (<0.01)		(<0.01)	(<0.01)	(0.26)

The results indicate that VC-backing is more likely when a firm is in technology intensive industry and as the target's size rises. VC-backing is also more likely for stock financed acquisitions, which may be capturing an added non-linear target size effect, since the frequency of equity financing rises with target size. Finally, relative deal size appears to be insignificantly different across the two samples.

To match 'treatment' units with 'control' units, we first estimate the propensity scores, or fitted values for both the VC-backed and non VC-backed deals using the logistic regression model. Second, we separate the treatment and control groups (VC-backed and non VC-backed deals) and sort the observations within each group from lowest to highest scores. In the third step, we discard those observations involving non-VC-backed targets that have an estimated propensity score lower (higher) than the minimum (maximum) propensity score of VC-backed targets. This interim step is for the purpose of eliminating observations from the control group that are not comparable to the treatment group firms. Fourth, we stratify all the targets into blocks defined by quantiles (for example, quartiles or deciles) of the propensity score distribution for the VC-backed

[23] As a robustness check, we estimate a logistic regression without employing the bootstrap method and use all VC-backed and non-VC-backed target acquisitions. This does not alter the qualitative results.

targets – the treatment group. Fifth, we perform balancing tests for each variable specified in the logistic regression model as well as for the propensity scores themselves. These balancing tests are based on differences in means t-tests between the VC-backed and non-VC-backed targets within each block.

The next step in the algorithm depends on the outcome of the balancing tests. If all blocks are well-balanced (i.e., the t-tests are not significant), the algorithm ends. However, if a block is not well-balanced, it can be divided into finer blocks and the process is repeated. In our analysis of the balancing tests, based on the estimation of the logistic regression model, the resultant seven blocks are all well-balanced, which ensures that even though both groups of targets are different in a number of characteristics, they are comparable within the blocks defined. Next, we rank all firms in each block (in both the samples) based on their propensity scores. Finally, for each 'treatment' firm, we seek the nearest match from the 'control' sample without replacement based on the following three criteria:

i) No evidence of confounding major news announcements (earnings, dividends, strategic alliances, stock splits etc.) in the five-day trading period (event days -2 though 2) surrounding the announcement date of acquisition of the target firm.
ii) Industry match based on a 3-digit SIC codes if possible, followed by a 2-digit SIC codes (if 3-digit SIC codes do not match) and finally single-digit SIC codes (when both 3-digit and 2-digit SIC code matches are unavailable).[24]
iii) Minimal absolute difference in propensity scores of 'treatment' and 'control' firm.

After we match VC-backed and non VC backed targets and eliminate contaminated acquisition announcements, our dataset consists of 178 completed deals in each of the sub-samples.[25]

[24] If no industry match is found, we match based on the other two criteria only. In an alternate logistic regression, we include dummy variables for all 2-digit SIC codes along with the other four predictive variables and year fixed effects. The analysis on accordingly matched samples of VC-backed targets and non VC-backed targets remain qualitatively similar.

[25] As robustness, we also match our samples utilizing a more traditional sequential matching procedure and also correct for potential endogeneity using the Heckman procedure. Our qualitative results remain robust as explained in more detail in section VI. However, there are two limitations to utilizing the entire sample of non-VC backed targets, consisting of more than 2100 acquisitions in our analysis. One, the non VC-backed acquisition sample is likely to include other contemporaneous news releases, which are not precluded by our sampling procedure. Second, data on the purchase price to book value ratios of targets, which enables us to analyze the impact of VC backing from both acquirer and target perspectives, is not available for a wide majority of cases in the SDC databases. By matching VC-backed and non VC-backed targets following Dehejia and Wahba (2002), we are able to hand-collect the target specific financial data from SEC filings for a more closely matched sample, giving us more reliable evidence. Thus, we also report all our analyses for matched samples that are an outcome of the propensity score matching technique.

Descriptive Statistics

Table 2 lists the number of VC-backed and non-VC-backed targets in our matched sample by industry groups. As noted earlier, nearly 69% of VC-backed targets belong to technology intensive industries. Propensity score based matching across both industry and technology-intensive sectors appear to produce reasonable matches, since nearly 64% of non-VC-backed targets are also drawn from technology intensive sectors.

Table 3, Panel A reports the differences in firm characteristics across the two acquisition samples (i.e. VC-backed targets and the matched non-VC backed targets) using a standard t-test for a difference in means as well as the Wilcoxon test for difference in medians. In general, VC-backed targets are slightly larger in size, their acquirers are larger too and so is their relative deal size. However, none of the differences is statistically significant. The mean (median) size of VC-backed targets is $195 ($63) million, which is insignificantly different from the mean (median) size of $176 ($62) million for non-VC-backed targets. The mean or median differences in acquirer size and relative deal size across the two samples are statistically insignificant as well. This indicates that the matches are relatively close, though imperfect. So we also control for these characteristics in our multivariate analysis.

Table 3, Panel B reports the frequency of acquisition financing methods for the two matched samples. Acquisitions of VC-backed targets are mainly financed with stock (63%) or a mixture of cash and stock (17%). Comparing the two samples on the basis of financing methods also indicates close matching on this dimension given that approximately 80% of the acquisitions of the matched non-VC-backed targets and 80% of the VC-backed targets use stock financing. The closeness of the sample matching on all four dimensions – deal size, relative deal size, acquisition currency and technology intensity - substantially alleviates concerns about selection bias that arise from the non-random nature of the VC investing decision.

Table 3 – Panel C reports basic financial information on the pairs of acquisitions. Since all our targets are privately held, we find that only 40% of the targets have the required data available from the standard publicly available databases. To expand our sample of targets with the necessary information needed for our analysis, we hand-collect from SEC filings the most recent information prior to the acquisition announcements on a target's total assets. As a result, we are able to obtain this basic financial information for nearly 90% of our sample. The distributions are quite skewed with large variability; hence both means and medians are reported for each of the target groups. The analyses of mean and median total assets reveal that the two groups of targets are insignificantly different. The median total book assets figure of VC-backed (non VC-backed) targets equals $12.25 ($12.18) million. The ratios of purchase price to book value are also not

different across the VC-backed and non-VC-backed targets. The median purchase price to book value ratio of VC-backed (non VC-backed) target is 5.09 (3.94).[26] In summary, the two groups of targets are well matched on the following dimensions: industry, technology intensity, acquisition financing method, deal size, relative deal size and book assets.

IV. Acquirer Returns for VC-backed and non VC-backed Targets

We estimate the abnormal returns using a standard market adjusted return model:

$$AR_i = r_i - r_m$$

In the above model, r_i is the return on firm i and r_m is the value-weighted market (CRSP) index return.[27] We calculate a cumulative abnormal return (CAR) for the five-day (event days -2, 2) period around the acquisition announcement (event day 0), which are drawn from SDC's M&A database and then verified by searching the Lexis-Nexis and Factiva databases**.** Moeller, Schlingemann and Stulz (2004) report that SDC announcement dates are accurate within two trading days of the actual acquisition announcement dates. Brown and Warner (1980) show that for short-window event studies, weighting the market return by the firm's stock beta does not significantly improve the power of the test, given the estimation error for beta and the small expected size of the daily market return.[28]

Univariate Analysis of Acquisition CARs for VC-backed and non VC-backed Targets

Acquirer mean and median five-day abnormal stock returns on the announcements of private firm acquisitions are presented in Table 4.[29] As shown in Panel A, acquirer mean (median) abnormal returns for announcements of stock and cash financed acquisitions of 5.37% (3.49%) and 4.22% (3.48%) respectively are not statistically different. However, as shown in Panel B, acquirer mean (median) abnormal returns for announcements of VC-backed targets is 7.82% (5.89%), which is significantly higher than the 2.46% (1.80%) mean

[26] Including target-specific financial information - book assets, their log values, or transaction price deflated by book assets - in our analyses does not qualitatively, alter the basic results. We do not report the results both for reasons of brevity and the reduced sample size resulting from available information pertaining to less than 90% of the cases.

[27] Results using the equal-weighted market (CRSP) return are qualitatively similar.

[28] See also Brown and Warner (1985). However, as a robustness check, we also calculate cumulative abnormal returns to acquirers using the constant mean return model: $AR_{it} = R_{it} - E(R_i)$ where AR is the abnormal return for firm i during the period t (t=5 days) after adjusting for average returns to firm i calculated from 6 to 270 days prior to the acquisition announcement date. When using this specification for acquirer CARs, the results remain qualitatively unchanged.

[29] Results using 4- and 3-day windows (i.e. CAR(-2,1) and CAR(-1,1)) are qualitatively similar, though smaller in size. All of our other main results are also robust to these alternative event windows.

(median) abnormal return for announcements of the matched acquisitions of non-VC-backed targets. Over 70% of acquirers of VC-backed targets experience positive announcement abnormal returns; in contrast less than 60% of acquirers of non-VC-backed targets experience positive announcement returns. These results are highlighted by Figures 1A and 1B which show daily mean and cumulative abnormal returns to acquirers of VC-backed and non-VC-backed targets respectively. The difference in mean and median cumulative abnormal returns for acquisition announcements of VC-backed and non-VC-backed targets is both economically meaningful and statistically significant.

Panel C of Table 4 reports acquisition announcement returns for stock financed offers. The mean (median) abnormal return to acquirers of VC-backed targets is 8.23% (5.82%), which is significantly different from the mean (median) abnormal return of 2.51% (1.95%) to the matched acquirers of non-VC-backed targets. The difference is significant at the 1% level. Panel D of Table 4 shows that acquirers announcing cash offers have positive abnormal returns. This evidence contrasts with the findings reported in Chang (1998) of an insignificant mean abnormal return to acquirers announcing cash offers. For cash offers, over 71% of acquirers of VC-backed targets experience positive mean abnormal returns, in comparison to about 51% for acquirers of non-VC-backed targets. For cash offers, the mean and median differences in announcement CARs between VC-backed and non VC-backed targets are 3.90% and 5.72% respectively and the latter difference is statistically significant at the 10% level.

Multivariate Analysis of Acquisition CARs for VC-backed and non VC-backed Targets

We now turn to multivariate analysis of acquirer announcement effects, where other potential differences across the samples of VC backed and non VC backed targets are more precisely controlled for using a linear regression model. We examine the relation of acquirer announcement returns to VC-backing after introducing the following control variables: log of acquirer size, relative deal size, market to book ratio in the target firm's industry in the year of the takeover announcement, volatility of acquirer's excess stock returns (measured from 270 to 6 trading days prior to the acquisition announcement), as well as indicators for (1) VC-backed targets, (2) common stock financed deals (partially or completely), (3) within industry deals based on their 2-digit SIC codes (a proxy for potential synergies between acquirer and target), and (4) high technology intensive targets.[30] Moeller et al (2004) provide evidence that

[30] Detailed variable definitions are found in the Appendix. We also examine alternative measures of stock acquisitions and the effect of high-tech combinations. First, we create a variable indicating the percentage of

the size of the bidder is a key determinant of the bidder's announcement period abnormal returns with larger bidders exhibiting poorer announcement returns. Prior research documents a significant relation between relative deal size and acquirer returns. As described by Fuller, Netter, and Stegemoller (2002), the relative size of the target is a proxy for several effects. The most important effect is that the larger the target is relative to the acquirer, the greater the potential effect of the acquisition on an acquirer's share value, and the more likely the market reaction can be detected. A higher market to book ratio in the target industry is an indication of favorable investment opportunities.

Table 5 presents regression estimates for acquirer announcement CARs for models with and without stock financing and VC-backing since they could both be endogenously determined. In the first three models, the coefficient estimates for stock acquisitions are statistically insignificant, while coefficient estimates for VC-backed targets are positive and statistically significant at the 1% level. These results are consistent with acquisitions of stock financed deals being negligibly different from cash financed deals, while acquisitions of VC-backed firms are substantially more profitable for acquirer shareholders than acquisitions of non VC-backed firms. The coefficient on relative deal size is positive and statistically significant, indicating that the market views relatively larger deals as more beneficial to an acquirer or alternatively that we are better able to detect the acquisition's economic effects. The coefficient on acquirer stock return volatility is also significantly positive. The coefficients on the other variables, namely log of acquirer size, intra-industry acquisitions, technology-intensive targets and target industry market-to-book ratio are all statistically insignificant.[31]

In model 4 of Table 5, we replicate the analysis on the sub-sample of acquisitions that are partially or completely stock-financed. We find that the VC-backed target indicator remains positive and significant for five-day announcement returns. Thus, acquisitions of VC-

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stock financing involved in the deal and second, we redefine high-tech target indicator to represent those cases where both the acquirer and the target belong to the high-tech industry. Our qualitative results remain unchanged with these changes in the model specification. Finally, weighting acquirer CARs with volatility of acquirers' excess stock returns yields similar qualitative results.

[31] We also include acquirer-specific characteristics, namely leverage, Tobin's Q, free cash flow (all three are calculated for both the previous year as well as the previous quarter), and stock price run-up (the run-up is calculated from the 120th trading day to the 11th trading day prior to the acquisition announcement) in unreported regressions. However, none of these variables is significant and their inclusion doesn't alter our basic results. We do not report the results both for reasons of brevity and the reduced sample size because information is not available for all the cases. We also interact the high-tech target and intra-industry deal indicators, but the coefficient estimate is not statistically significant.

backed targets lead to significantly higher acquirer announcement returns, which are substantially larger than equity financed acquisitions.

V. Profitability in Acquisitions of VC-backed Targets: VC Liquidity, VC Grandstanding, VC Moral Hazard, CVC Strategic Focus and VC Acquisition Currency Hypotheses

Comparison of Mean and Median Acquisition CARs for Samples of VC-backed Targets

To more carefully evaluate the descriptive power of our VC-based hypotheses, namely *VC liquidity, VC grandstanding, VC moral hazard, CVC strategic focus* and *VC acquisition currency,* we restrict our attention to VC-backed acquisitions. Focusing on the VC-backed sample should improve the power of our tests to distinguish among these competing VC based hypotheses. We distinguish among VC-backed acquisitions using variables that allow us to separately test the predictions of our five hypotheses, as is discussed below**.** We initially examine the mean and median acquirer announcement returns across the various sub-samples of VC-backed acquisitions and follow this with multivariate regression analysis.

The *VC liquidity* hypothesis is based on the fact that VC funds are primarily organized as limited partnerships that are self-liquidating on a fixed termination date. VC funds nearing their termination dates experience greater pressure to liquidate their investments. As a consequence, VCs may use their control rights and the company's need for further funding to pressure managers to sell portfolio companies quickly, causing sales at relatively lower prices. The result is lower purchase price to book value ratios for targets and higher wealth gains for acquirer shareholders. We measure VC fund liquidation pressure using the interval between the acquisition announcement date and the lead VC fund's initial closing date. We construct an indicator variable representing the top tercile of the VC funds farthest away from liquidation and therefore facing relatively less liquidity pressure. The lead VC is defined as the VC making the largest investment in the target across all rounds of VC funding. To test the *VC liquidity* hypothesis, we compare acquisitions of VC-backed targets when VC fund liquidation pressure is relatively high to when the pressure is low.

To test the *VC grandstanding* hypothesis, we measure the lead VC firm's age at the acquisition announcement since older VC firms have greater experience and more extensive network of contacts, which should lead to more competition to acquire their portfolio firms and more effective negotiations by target managers. In our analyses, we use the age of the lead VC firm to construct an indicator variable representing the youngest tercile of VC firms.

For the *VC moral hazard* hypothesis, we create an indicator variable to capture the dual financial relationship a VC has with both the acquirer and target firms. We hand-collect information on VCs' relation with acquiring firms from a variety of sources such as SEC filings, annual reports, prospectuses and web searches. We uncover thirty cases of a potential conflict of interest / moral hazard problem. In twenty five cases, a VC held equity stakes in both the acquiring and target firms. In five other cases, weaker financial relationships with the acquiring firms are found.[32] In constructing the VC moral hazard indicator variable, we include the twenty five cases where the same VC held share ownership in both the acquirer and the target. Our results remain robust when we extend our analysis to include all 30 cases denoting VC conflicts of interest.

As mentioned earlier, strategically oriented CVCs have fundamentally different incentives from financially oriented traditional VCs. In addition, CVCs typically have considerably less experience investing in the private equity market. As a result, potential acquirers are likely to factor into their offer prices CVCs' frequent impatience and limited private equity experience, raising acquirer announcement returns. We test the *CVC strategic focus* hypothesis using an indicator variable for the existence of a CVC in the VC syndicate. We find that 38 of the 178 VC-backed targets include CVC investors and 36 of these CVC investments in targets appear to offer strategic benefits to the CVC parent.[33] We code whether there is a strategic fit between the CVC parent and the target firm based on information collected from a variety of sources as explained below. If the two parties have the same 2 digit SIC code, then we classify the CVC investment as strategic. We also read SEC filings by CVC parents to uncover any operating relationships between the two parties. For instance, if the CVC parent is a customer, supplier, strategic alliance partner, or technology licensor to the target firm, we classify the CVC investment as strategic in nature. Finally, we use web searches to obtain further information on the nature of operating relationship between the target firms and CVC parents.

Finally to test the *VC acquisition currency* hypothesis, we segment targets based on the acquisition's financing choice. Table 6 presents mean and median acquirer CARs and univariate tests for differences in means (medians) using a standard t-test (Wilcoxon test). Table

[32] In three cases, VCs backing the targets had a customer / supplier relationship with the acquiring firms while in two cases VCs, who are also investment banks or commercial banks, are acquirer underwriters / M&A advisors within one year prior to the acquisition transactions.

[33] The mean (median) asset size of targets backed by CVCs is $299 ($120) million. This is in comparison to the mean (median) asset size of $195 ($63) million for the entire sample of VC-backed targets. Thus, CVCs appear to prefer investments in larger firms relative to TVCs.

6, Panel A reports acquirer CARs for targets backed by VC funds segmented by whether the fund is near or far from fund liquidation, using an indicator for funds in the youngest third of our sample. Targets backed by older VC funds lead to higher acquirer returns, though the difference is not statistically significant. This is weak evidence in support of H1: the *VC liquidity* hypothesis. In Panel B of Table 6, acquisitions are distinguished by VC experience using an indicator for young VC firms (the youngest third of our sample). We observe that mean and median acquirer announcement returns are greater for VC funds with less experience, though again the difference is not statistically significant. This weakly supports H2: the *VC grandstanding* hypothesis.

In Panel C of Table 6, we observe significantly higher acquirer returns in deals involving clear VC conflicts of interest, which support H3: the *VC moral hazard* hypothesis. More specifically, mean and median acquirer announcement effects (CARs) in acquisitions susceptible to a VC moral hazard problem are 14.93% and 12.07% respectively, and the portion of the sample with positive acquirer announcement effects is 84%. By way of contrast, the mean and median acquirer announcement effects in VC-backed acquisitions without conflicted VCs are notably lower, at 6.59% and 4.80% respectively, and the portion of the sample with positive acquirer announcement effects is only 69%. In Panel D of Table 6, acquirer returns for deals involving targets backed by CVCs are compared to targets without CVC involvement. Mean and median acquirer CARs in deals involving CVC backed targets are 15.91% and 9.53% respectively, which are significantly greater than the mean and median acquirer CARs in acquisitions without CVC investment of 5.55% and 4.39% respectively. This evidence is consistent with H4: the *CVC strategic focus* hypothesis. Finally in Panel E of Table 6, we observe that the acquirer returns for deals involving stock are not significantly different from those purely involving cash.

Multivariate Analysis of Acquisition CARs for VC-backed Targets

In this section, we analyze VC-backed acquisitions in a multivariate setting to better assess the causes for higher acquisition announcement returns. The results from the univariate analysis suggest that the *VC liquidity, VC grandstanding* and *VC acquisition currency* hypotheses are less promising explanations for the observed acquirer announcement returns. However, it is possible for these conclusions to change in a multivariate setting. To further explore the reasons for higher announcement effects in acquisitions of VC backed targets, we again use the same control variables employed in Table 5.

Table 7 presents a multivariate analysis of the acquirer announcement CARs focusing on the hypotheses 1-5 individually in the first 5 models and then jointly in the last model. Model 1

presents a test of H1, the *VC liquidity* hypothesis. We find that the indicator variable for funds further from maturity is negative as expected, though statistically insignificant. In model 2, we test H2: the *VC grandstanding* hypothesis. We find that the indicator variable for younger, less experienced VCs is positive as expected, though statistically insignificant.

Examining model 3, we see that the VC moral hazard indicator has a positive and significant coefficient. This is consistent with higher acquirer CARs when a financial relationship exists between a VC and the acquiring firm. Such situations are likely to reflect a conflict of interest between the VC and other target investors, which results in higher wealth gains for acquiring firms and lower returns to the other target investors. On average, the presence of such dual relationships results in nearly 7% increase in acquirer CARs during the five-day window. The evidence thus supports H3, the *VC moral hazard* hypothesis.

Model 4 tests H4 the *CVC strategic focus* hypothesis by assessing whether CVC backing affects acquirer announcement CARs, using an indicator for the presence of a CVC in the VC syndicate. We observe that CVCs are associated with higher average acquirer CARs, which average 8.4% higher over the 5-day announcement period. In model 5, we test H5, the *VC acquisition currency* hypothesis by using an indicator for acquirer stock financing. We find stock financing has very little impact on the average acquirer announcement return.

Finally, in model 6 of Table 7, we jointly test the significance of the five hypotheses on acquirer announcement returns. We again find support for the *VC moral hazard* and *CVC strategic focus* hypotheses. In all six models, we also find the coefficient on acquirer stock return volatility to be significantly positive. We also find that acquisitions at times of relatively high investment activity in targets' industry (measured by market to book ratio) lead to significantly lower acquirer returns, which may reflect greater competition for these targets. Finally, the remaining control variables including the intra-industry deal indicator are insignificant.[34]

To further test the *CVC strategic focus* hypothesis, we investigate whether CVCs tend to reduce their venture investment activity subsequent to portfolio firm acquisitions**;** where we view such behavior as an indicator of shifting strategic goals by CVC parents, which can result in higher gains for acquirer shareholders. A shifting strategic focus by a CVC parent can manifest itself in frequent changes in CVC investment activity and a more tentative parent commitment to VC funding. If a CVC has experienced weak financial performance (i.e. no IPOs) and its parent has realized few strategic benefits from its CVC investments, then a CVC parent may decide to reduce or discontinue its venture investment activity. We test this prediction by comparing the

[34] Gompers and Xuan (2005) look at a related question of long term performance of acquirers of VC-backed targets firms and report somewhat better performance for acquirers undertaking related acquisitions.

aggregate investments of each CVC for up to six years before and after the acquisition announcement year.[35] To control for VC industry conditions, IPO market conditions and the direct effect of the acquisitions, we compare CVC investments with those of traditional VCs that back other acquisition targets around the same calendar time.

On examining the trends in aggregate CVC investments in the years following portfolio company acquisitions, we find that nearly 60% of CVCs reduce the *number* of investments they make (Panel A of Table 8) as well as their *dollar values* (Panel C of Table 8). Moreover, almost 45% of CVCs reduce new investment levels by at least half in the subsequent years. On the other hand, following a portfolio firm acquisition, TVCs increase their number of venture investments as well as their dollar values. Furthermore, the ratio of venture investments in the post- to pre-announcement periods is significantly greater for TVCs than for CVC investors (Panels B and D of Table 8). Finally, we also find a significant positive correlation between acquirer CARs and an indicator variable representing those CVCs that reduce their venture investments in the post-acquisition period, as shown in Panel E of Table 8. Since an acquisition is generally the only feasible option for a *rapid* liquidity event or exit for a VC, these acquisitions of CVC-backed targets are expected to exhibit higher acquirer returns and be correlated with post-acquisition reductions in CVC venture investments. Thus, higher average acquirer CARs observed at acquisition announcements of CVC-backed targets is consistent with the *CVC strategic focus* hypothesis and implies that on average CVCs do not replace their venture investments in acquired portfolio companies with new venture investments.

Univariate and Multivariate Analysis of Purchase Price to Book Value Ratio of Target Assets

To further evaluate our various VC conflicts of interest hypotheses, we next examine the purchase price to book value ratio (deal size divided by book value of target's total assets) for VC-backed targets based on the proxy variables that capture the predictions of our five hypotheses**.** If VC involvement affects acquirer CARs, then it is also likely to affect target

[35] For example, if the CVC backed target firm is acquired in the year 2001, the CVC investment trends in the years 2002-2004 are compared to the investment levels in the years 1999-2001 (or 1998-2000 for robustness). Both the number of CVC investments and their investment levels are analyzed symmetrically on either side of the acquisition announcement year.

purchase prices. Since the target purchase price is likely to be a positive function of target size, we control for the size effect by scaling target purchase price by its book value.[36]

Table 9 presents univariate comparisons across subsamples of acquisitions. Panel A presents evidence that sales of targets backed by VC funds farther away from liquidation, occur at significantly higher purchases prices relative to their book values. This is consistent with H1, the *VC liquidity* hypothesis, and suggests that when VCs face stronger incentives to liquidate their investments, they put greater pressure on their portfolio firms to sell and avoid extended negotiations which might cause the potential acquirers to walk away from proposed deals. The end result is a sale of the target firm at a relatively lower price.

In Panel B of Table 9, we see some evidence consistent with H2: the *VC grandstanding* hypothesis. We find that the purchase price-to-book value ratios for younger VC firms tend to be lower than those for older and more experienced VC firms. Specifically, the older VC firms have mean and median purchase price-to-book value ratios of 20.04 and 5.15 respectively, while the younger VC firms have mean and median purchase price-to-book value ratios of 14.25 and 5.16 respectively. However, given the large standard deviations, the differences are not statistically significant. This is weak evidence supporting H2: the *VC grandstanding* hypothesis.

To further test this prediction of H3, the *VC moral hazard* hypothesis, we examine the targets' purchase price-to-book value ratios and expect to observe a lower purchase price to book value ratios when VCs are conflicted. If VCs have conflicts of interest with other target investors because of financial relationships between VCs and the acquiring firms, we should expect that negotiations over target purchase prices will be adversely affected, and target purchase prices are likely to be lower in such situations. Panel C of Table 9 presents mean and median purchase price-to-book value ratios for targets backed by VCs with clear conflicts of interest and those targets backed by VCs without clear conflicts. The mean (median) purchase price-to-book value ratio for targets backed by VCs with conflicts of interest is 8.47 (2.98) compared to a mean (median) of 19.45 (5.50) for cases where VCs have no dual financial relationships. The difference in purchase price-to-book value ratios is similar when we expand the definition of VC conflicts to include other dual financial relationships beyond shareholdings in both the acquirers and targets. Further, these differences are statistically significant. This supports the conjecture that when VCs are potentially conflicted, the purchase prices received by targets are lower. Thus, the evidence suggests that VC incentives to support aggressive negotiations aimed at raising purchase prices of

[36] We also treat acquisitions of target equity differently from acquisitions of target assets. In acquisition of target assets, we adjust target purchase prices by subtracting the target debt levels which are also part of the transactions. All our results remain qualitatively similar.

their portfolio firms are tangibly compromised by these dual financial relations and result in higher wealth gains for acquirer shareholders.

Panel D of Table 9 compares the purchase price-to-book value ratios of targets backed by CVC and TVC investors. The mean (median) purchase price-to-book value ratio for CVC backed targets is 23.30 (9.95), which is higher than the mean (median) of 16.44 (4.52) for targets not backed by a CVC. The median differences are statistically significant although the mean differences are not significant. Finally, in Panel E of Table 9, we compare targets acquired with cash to targets acquired with stock. We find that the mean and median purchase price-to-book value ratios of targets purchased with cash are significantly lower than those of targets purchased with stock. This is consistent with stock financed deals requiring higher acquisition prices to compensate target investors for the higher risk and lower liquidity of using stock as the acquisition currency.

Table 10 presents a multivariate analysis of purchase price-to-book value ratios, controlling for the same deal characteristics as in Table 7, and also including a 1999-2000 period indicator. In the first model, we have an indicator for VC funds farthest from maturity (bottom third of the sample). The significant positive coefficient suggests that younger VC funds face less liquidity pressure, which allows portfolio firm management to be more aggressive in their acquisition negotiations. Conversely, VC funds closer to liquidation appear to pressure target managers to sell out more quickly at lower purchase prices. This evidence is consistent with H1: *VC liquidity* hypothesis.

The second regression model includes a measure of VC experience, captured by an indicator for young VC firms (bottom third of the sample). The *VC grandstanding* hypothesis predicts that targets backed by younger VC firms are likely to be purchased at lower prices relative to their book values. While this coefficient estimate is negative, it is not statistically significant. Thus, this evidence weakly supports H2: the *VC grandstanding* hypothesis.

The third equation of Table 10 tests the impact of *VC moral hazard* hypothesis on target purchase price to book value ratios. We find a negative coefficient on the moral hazard indicator, consistent with the prediction that the targets backed by conflicted VCs receive lower prices relative to their book values. The fourth equation includes a CVC-backed target indicator; however, the coefficient estimate is insignificant suggesting that CVC backing does not have a strong impact on target prices. In the fifth equation of Table 10, when we substitute a stock financing indicator for the CVC variable, we see that the target purchase price to book value ratio is significantly higher under stock financing. This suggests that acquirers pay higher purchase prices when risky stock is used as acquisition currency. Finally, the last equation in Table 10

presents a joint test of these hypotheses by including all five of the above indicator variables. The results are consistent with the earlier estimates, though the model's explanatory power is higher. We also observe that high-tech acquisitions and transactions involving acquirers with more volatile stock returns lead to higher purchase price to book value ratios. Finally, when market-to-book ratios in target industries are higher, acquirers pay more for targets. This is noteworthy given the acquirers also realize lower announcement returns during such times.

Taken together, the evidence on acquirer CARs and target purchase price to book value ratios provide strong support for the *VC moral hazard* hypothesis and weaker support for *VC liquidity* and *CVC strategic focus* hypotheses. While *VC grandstanding* behavior also leads to higher acquirer CARs and lower purchase price to book value ratios, these effects are not statistically significant. There is also some weak evidence that the use of stock currency has financial benefits for both the acquirer and target.

VI. Robustness Checks

Matching VC-backed and non VC-backed Acquisitions Using a Traditional Matching Procedure

To assess the effectiveness of our propensity score matching procedure and alleviate any concerns that our results are driven by an inaccurate matching procedure, we replicate our earlier results using a more traditional matching procedure. As noted earlier, the more traditional matching procedures are not as effective as the propensity score technique in taking into account the multiple characteristics of the paired samples and as a result are unlikely to closely match the key characteristics in the two samples. In part, this reflects a well known problem with the traditional sequential matching approach, i.e. when matching is performed across several criteria, the first characteristic is matched more exactly than subsequent characteristics. To match VC-backed and non VC-backed targets, we require (1) a similar deal size (the deal size of the non-VC-backed target should be within 50% and 150% of that of its matched VC-backed target), (2) similar relative deal size (the relative deal size of the non-VC-backed target is constrained to be within 50% and 150% of that of the VC-backed target), and (3) similar acquisition announcement dates (the acquisition announcements of the VC-backed target and its matched non VC-backed target should be within 90 days of each other).

Existing empirical evidence documents that mergers and acquisitions activity occurs in waves over time and is concentrated in a small number of industries (Andrade, Mitchell and Stafford (2001)). Thus, firm characteristics could differ for acquisitions occurring in different waves or outside these waves (Harford (2005)). To control for differing economic conditions, we

match on announcement dates as well. All our earlier results remain qualitatively similar after we implement this procedure. Moreover, our results are not specific to a particular matching approach or the sequence adopted for matching the two samples of targets across multiple criteria.

Controlling for Endogeneity using the Heckman Correction

The purpose of matching VC-backed and non VC-backed targets on several dimensions is to ensure a closely matched sample in order to control for the endogenous nature of VC backing. Using both the 'non-traditional' propensity score technique and a 'more' traditional matching procedure we have shown that VC-backed targets create higher wealth gains for the acquirer shareholders on acquisition announcements. As an alternative control for endogeneity, we use the Heckman correction procedure to generate consistent model estimates after adjusting for selection bias. Data on VC-backed acquisition announcements are combined with *all* non VC-backed acquisition announcements.[37] In the first-step model, we estimate the likelihood of targets being VC-backed using a logistic regression framework. In the second-step linear regression, we include the inverse Mills ratio, *Lambda*, obtained from the first-step estimation as an additional regressor in our earlier model of acquirer announcement returns:

First Step (Logit): $Prob\ (VC\ backed\ target) = a_0 + a_1\ Control\ Variables + \varepsilon$

Second Step: $CAR(-2,2) = b_0 + b_1\ VC\ backed\ target + b_2\ Control\ Variables + b_3\ Lambda + \eta$

The first step estimates a predictive model for VC-backed targets in our sample of privately held firms. The instruments used in the selection equation include six indicator variables denoting targets in high-tech industries, and targets headquartered in California, Massachusetts, New York and Texas. Prior research shows that VC investments are largely concentrated in these four states, making the likelihood that VC-backed targets are headquartered in these states high. We also include the aggregate IPO proceeds in the most recent three months ending in the acquisition announcement month. VCs have been found to time their exits to periods with better IPO market conditions (Lerner (1994b)), which raises the expected proportion of VC-backed targets in such times. Finally, to account for overall VC activity in the market, we include aggregate VC investment in the most recent three months ending in the acquisition announcement month.

Table 11 reports the effect of VC backing on acquirer CARs after controlling for selection bias. The first column of Table 11 indicates that the likelihood of a target having VC backing is significantly related to indicator variables for targets in high-tech industries and headquartered in the states of California and Massachusetts. Increased aggregate IPO and VC investment activity is also

[37] These announcements could include other firm news releases.

accompanied by an increased proportion of acquisitions of VC-backed targets. The second-step estimates, presented in the last three columns of Table 11, are similar to those reported in Table 5. Most importantly, the VC-backed indicator continues to be significantly related to acquirer CARs. The inverse Mills ratio derived from the first-step estimation is also significant at the 5% level, suggesting that it is important to control for selection bias arising out of the non-random nature of the VC investment process. In summary, our results do not appear to be caused by selection bias arising from a common set of VC investment criteria.

Acquisitions and CVC Motives for Exiting from Portfolio Firm Investments

In the previous section, we introduced a possible explanation for the larger average acquirer CARs observed in CVC-backed acquisitions. CVCs have a strategic focus as well as a financial motive and are more likely to exhibit impatience in exiting from their venture investment portfolio as parent strategies shift. For example, one reason for a reduction in CVC investments is a change in a CVC parent's strategic focus. Another reason for a reduction in CVC investments following a portfolio company acquisition is the cyclical nature of the venture industry as well as economy-wide and industry-wide business cycles, which may cause large swings in VC profitability and lead to the observed patterns in CVC investing and harvesting. While this is a possibility, we find that on average subsequent investments made by TVCs rise following their portfolio company acquisitions, which is inconsistent with this explanation.[38] However, it is difficult to disentangle the effects of venture investment cyclicality from the effects of CVC strategic focus on acquirer CARs. Indeed shifting CVC strategic focus and lack of commitment to venture investing are likely to be most visible in times when the overall venture industry or 'new' business activity are depressed.

In a study of strategic venture investing, Masulis and Nahata (2006) find that CVC equity ownership in a portfolio company is relatively higher when its first investment occurs in a 'cold' venture capital market. In other words, when overall VC fund raising and investment is depressed, CVCs are relatively more active, which is perhaps explained by their deeper pockets and better access to new capital. CVCs with strong parental backing are better able to weather the impact of VC market cyclicality on their portfolio investment activity. Thus, we conclude that the observed patterns in CVC investments are unlikely to be explained by the cyclicality of VC investing, but

[38] We also examined whether TVCs and CVCs sell their portfolio companies in differing economic environments (e.g., business upturns and downturns) or if CVCs are relatively more active in particular industries compared to TVCs. We find that there are no significant differences in market conditions when CVC- and TVC-backed companies are sold or taken public. Our analysis of profitable exits also reveals that CVCs are not any more active than TVCs in any particular industry or year for our sample period.

instead appear to be a result of the relative inexperience and impatience of some CVCs. These CVC characteristics not only lead to higher acquirer announcement returns, but also result in a post-acquisition fall in investment activity by these CVCs.

As a further robustness check, we re-examine CVC backed acquisitions after excluding those announced in the 1999-2000 "Internet bubble" period. We again find a significant positive correlation between acquirer CARs and an indicator denoting reduced CVC investments in the post-acquisition years. Finally, we exclude the small number of financially oriented CVCs from the analysis and continue to find similar results. Overall, the evidence suggests that the higher average acquirer announcement returns for CVC-backed targets is at least partially due to CVC strategic focus and their impatience to exit from venture investments.

An alternate reason for the reduction in CVC investments could simply be a change in focus from investing to harvesting as CVC funds mature**.** To explore this issue, we exploit the fact that some CVCs are organized as captive limited partnerships (LPs) where fund managers receive greater financial rewards for generating high investment returns and have more independence from CVC parents and weaker incentives to pursue strategic objectives. To investigate whether acquisitions of firms backed by CVCs organized as LPs have a weaker strategic focus than those organized as corporations or limited liability companies, we create a limited partnership indicator (LP indicator) which takes a value of one when a CVC is organized as a limited partnership and is zero otherwise.[39] We find a significantly negative correlation between the LP indicator and the acquirer announcement returns and a weaker positive correlation with target purchase price to book value ratios, which is consistent with fund managers in limited partnerships having stronger financial motives and weaker conflicts of interest with other investors. Thus, these LP fund managers place more emphasis on maximizing a target's acquisition purchase price, which results in lower acquirer CARs. Overall, the evidence suggests that higher acquirer announcement returns for CVC-backed targets is partially due to shifting CVC strategic focus.

Interdependence of the Acquirer CARs and the Target Purchase Price-to-Book Value Ratios

So far, we have evaluated five competing hypotheses to explain acquirer CARs and target purchase price to book value ratios in two independent single equation models. Table 12 reports simultaneous estimation of the acquirer CAR and the log of the target purchase price-to-book

[39] For example, Intel Corporation's investment is treated as a direct investment by the parent corporation. However, an investment by Intel Capital is an investment from a captive limited partnership dedicated to making venture investments. Other captive LPs of corporations in our sample include Lucent Venture Partners, DSC Ventures, UPS Strategic Enterprise Fund, Xerox Technology Ventures, Qualcomm Ventures, Siemens Venture Capital etc.

value ratio equations for VC backed targets where we allow the log of the purchase price-to-book value ratio to enter the acquirer announcement return regression. The joint estimation yields results very similar to the estimates based on single equation estimation. Although the coefficient on the log of the purchase price-to-book value ratio has a negative sign, it is never statistically significant. The models differ in terms of which of the indicators associated with our five hypotheses are included in the two equations. The basic conclusions that we drew from our earlier analysis about the significance of the five hypotheses continue to hold under joint estimation of the acquisition announcement CARs and target purchase price to book value ratios.[40]

Purchase Price to Book Value Ratio and Endogeneity of the M&A Currency Choice

Finally, we investigate the potential endogeneity caused by using the acquisition's method of payment (stock or cash) as an explanatory variable in regressions of the target purchase price-to-book value ratio. The concern is that the choice of payment method could directly impact the size of the target's purchase price to book value ratio and vice versa. For example, using cash as merger currency can result in immediate tax recognition of long standing unrealized capital gains for target shareholders, which could induce target shareholders to demand higher purchase prices, ceteris paribus. This would in turn raise targets' purchase price-to-book value ratios. On the other hand, a high purchase price-to-book value ratio, especially for larger deals, may make stock a more attractive acquisition currency for acquirers, particularly when an acquirer has limited holdings of liquid assets and unused debt capacity. Because of the endogenous nature of these variables, the estimated coefficients in Table 10 could be biased and misleading. As a further robustness check, we estimate a two-equation simultaneous system that includes: i) a logit regression to predict stock financed acquisitions, and ii) a target purchase price-to-book value ratio equation.[41] As observed in Table 13, the coefficients on the VC liquidity and VC moral hazard indicators remain statistically significant with the same signs as before, supporting the *VC liquidity* and *VC moral hazard* hypotheses. We also find that deals involving higher purchase price-to-book value ratios are more likely to use acquirer stock as the acquisition currency. In summary, we find that our results are robust to the use of several alternate estimation methods and are insensitive to controlling for endogeneity.

[40] Joint estimation of the models for acquisition announcement CARs and target purchase price to book value ratios using the matched sample of VC backed and non VC backed targets yields qualitatively similar results, namely that acquisitions of VC backed targets lead to higher acquirer announcement returns. Moreover, the correlation between target purchase price to book value ratios and acquirer CARs is negative, although it is not statistically significant in this simultaneous equations framework.

[41] The second equation is a logit model estimating the likelihood of a stock offer, where the regressors are log of price to book ratio, log of acquirer size, high-tech target indicator, relative deal size, acquirer stock return volatility and a 1999-2000 indicator.

VII. Conclusion

The two most attractive investment exits for venture capitalists are IPOs and acquisitions. While the extant literature has largely focused on VC-backed IPOs and the positive impact of VC backing on young public companies, acquisitions of VC-backed private firms has not been studied in detail. Our study helps fill that gap by investigating the implications of VC investments in private firm acquisitions. We also contribute to a better understanding of the private firm acquisition market, which is an important issue in its own right. Finally, we document that conflicts of interest between classes of VC investors and other target investors can help explain the greater profitability of acquisitions of private firms relative to public firms.

In order to explore the causes of higher acquirer stock returns on announcements of private firm purchases, this study examines acquirer shareholder wealth effects and indirectly target shareholder wealth effects, conditioning first on whether a privately held target is venture capital backed and then on different classes of VC investors involved. Differential market reactions to these acquisition announcements suggest that VCs have a significant impact on the acquisition process, at least for privately owned targets. We find that the five-day cumulative abnormal returns realized by acquiring shareholders on acquisition announcements are higher for VC-backed targets than for non VC-backed targets. We also examine target purchase price-to-book value ratios to further assess the causes for these different announcement effects.

We find several strands of evidence suggesting acquisition decisions are affected by a variety of VC conflicts of interest with other investors in the portfolio companies. Specifically, we find evidence that when VCs are under pressure to liquidate their investments as their funds move closer to maturity, they pressure their portfolio firms to expeditiously negotiate a sell out. In these cases, acquirer returns are on average higher and target purchase price–to-book value ratios lower. This evidence indicates that VC funds further away from maturity give target firms freer rein to negotiate higher purchase prices over longer horizons. We also find evidence that younger VCs grandstand in the acquisition market to enhance their reputation, consistent with evidence in the IPO market found in prior studies. However, the magnitude of this effect we find does not lead to a significant increase in acquirer shareholder wealth.

We uncover other evidence that suggests venture capitalists can experience conflicts of interest, which affect the acquisition prices of their portfolio firms. When a VC investing in a target also has a direct financial tie to the acquirer, acquirer announcement returns are on average

higher. Furthermore, when such dual relationships exist, the purchase prices received by targets relative to their book values are significantly lower, suggesting that these dual VC relationships with the acquisition parties adversely affect the acquisition negotiation process from the viewpoint of other target investors. We conclude that VCs do not always act in the best interests of fellow shareholders. VCs – like other financial intermediaries – can have conflicts of interest with other investors in their portfolio firms. Our findings add to the evidence in Lee and Wahal (2004) that VCs can have perverse incentives to underprice their portfolio companies at the time they exit. We also uncover evidence that both informal and formal networks operating in the VC market are helpful in locating potential acquirers and in a number of cases, VCs appear to match targets with acquirers already in their venture networks**.**

On examining acquisitions of targets backed by corporate venture capitalists, we find acquirers experience relatively higher announcement returns. The evidence is consistent with the notion that corporate venture capitalists often have strong non-financial objectives and are less experienced participants in the private equity market and this can result in higher acquirer wealth gains on acquisition announcements. Consistent with this perspective, we find that corporate venture investors significantly reduce their venture investment activity in years immediately following acquisitions of their portfolio firms. This is consistent with reports in the business press that corporate VCs lack a long term commitment to the venture capital market, which may reflect changing strategic objectives by their parent corporations.

In summary, we find that VC-backed acquisitions lead to significantly larger acquirer announcement returns of nearly 5% over a 5-day window relative to non VC-backed deals. This difference appears to be explained in part by several conflicts of interest that exist between classes of VCs and other portfolio investors due to (1) VC fund liquidity pressures, (2) financial ties to acquirers, and (3) shifting strategic objectives of the corporate VC parents. We also find some weak evidence that younger VCs are apt to try to grandstand to establish an early track record of successful exits from their venture investments. Thus, we conclude that obtaining VC funding can entail added costs in terms of lower purchase prices when these portfolio firms are acquired.

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Appendix: Variable Definitions

Variable	Definitions
Dependent Variables	
CAR	Five-trading day acquirer cumulative abnormal return, stock return minus the CRSP market return, over event days (-2, 2) where the announcement day is event date zero
P/B Ratio	Purchase price of the target (Deal Size) divided by the target's book value of total assets for the fiscal year-end prior to the acquisition announcement
Explanatory Variables	
Deal-Specific Variables	
VC-backed Target	Indicator variable: 1 if the private target is VC-backed; 0 otherwise
Stock Acquisition	Indicator variable: 1 for deals financed at least by some stock; 0 otherwise
Deal Size	Purchase price paid to acquire the target
Relative Deal Size	Deal Size over acquirer size, where acquirer size is as defined below
High-Tech Target	Indicator variable: 1 if the target is from a high-tech industry as defined in Table 1; 0 otherwise
Intra-Industry Deal	Indicator variable: 1 if target and acquirer firms belong to the same industry based on matching of SIC codes at the two digit level; 0 otherwise
Target Industry Market to Book	Median market to book ratio in target firm's industry calculated in the year of the acquisition announcement
1999-2000 Period	Indicator variable: 1 if the transaction was announced in the years 1999 or 2000; 0 otherwise
Acquirer-Specific Variables	
Acquirer Size	Acquirer equity market capitalization one month prior to the announcement of the acquisition
Acquirer Stock Return Volatility	Standard deviation of an acquirer's daily excess (minus the value-weighted CRSP return) stock returns measured over event days -6 to -270 prior to announcement date (event day 0)
VC-Specific Variables	
VC Liquidity	Indicator variable: 1 denotes a third of the funds (in our sample) farthest from liquidation and is based on the time interval between the acquisition announcement date and the initial closing date of the VC fund.
VC Grandstanding	Indicator variable: 1 denotes a third of the least experienced VC funds in our sample and is based on the age of the lead VC firm at the time of takeover announcement.
VC Moral Hazard	Indicator variable: 1 if there exist potential conflicts of interest due to presence of equity ownership in both the target and acquiring firms by a common VC; 0 otherwise
CVC Strategic Focus	Indicator variable: 1 if there exists a corporate venture capitalist in the venture capital syndicate; 0 otherwise

Table 1

The acquisition sample period is 1991-2001. Acquisitions must have a relative deal size (deal size divided by acquirer's market value of equity one month prior to the acquisition announcement) of at least 10%. Panels A, B and C compare VC backed to non VC-backed targets. Acquirer size is measured by the market value of acquirer equity one month prior to acquisition announcement. Target size is the price paid for acquisition of the target. High-tech industries are classified as belonging to SIC codes 283 (biological products, genetics and pharmaceuticals), 481 (high-tech communications), 365-369 (electronic equipment), 482-489 (communication services), 357 (computers) and 737 (software services). A standard t test for a difference in means and Wilcoxon test for a difference in medians are used to compare VC-backed and non-VC backed targets.

Panel A: Comparison of Acquirer and Target Size

	VC-Backed Targets		Non VC-Backed Targets		Tests of Equality (p-values)	
	Mean	Median	Mean	Median	Mean	Median
Acquirer Size ($ million)	828	211	268	70	0.00***	0.00***
Target Size ($ million)	216	55	70	19	0.00***	0.00***
Target Size relative to Acquirer Size	0.45	0.24	0.46	0.23	0.87	0.81
Observations	229		2114			

Panel B: Frequency of Deal Financing Methods

	VC-Backed Targets		Non VC-Backed Targets		Tests of Equality (p-values)
	Number	%	Number	%	
All Cash	45	20%	985	47%	0.00***
Stock	184	80%	1129	53%	0.00***
Total	229	100%	2114	100%	

Panel C: Frequency of High-Tech Targets

	VC-Backed Targets		Non VC-Backed Targets		Tests of Equality (p-values)
	Number	%	Number	%	
High-Tech Industry	159	69%	504	24%	0.00***

Table 2

Takeover Activity by Industry and Classified by Venture Capital Backing

The sample period is 1991-2001. Acquisitions must have a relative deal size (deal size divided by acquirer's market value of equity one month prior to the acquisition announcement) of at least 10%. Non-VC backed targets are selected based on propensity score matching which is undertaken across the following deal characteristics: deal size, method of payment, relative deal size and target technology status. A firm's industry is classified by its primary 3 digit SIC code. High-tech industries are classified as belonging to SIC codes 283 (biological products, genetics and pharmaceuticals), 481 (high-tech communications), 365-369 (electronic equipment), 482-489 (communication services), 357 (computers) and 737 (software services).

	Industry	Number of VC-backed Targets	Number of non VC backed Targets
1	Oil, Gas & Energy	5	2
2	Food	2	2
3	Textiles & Clothing	1	1
4	Wood & Paper products	1	1
5	Chemicals and pesticides	--	1
6	Rubber and plastics	1	--
7	Manufacturing	12	11
8	Biological products, Genetics & Pharmaceuticals	15	9
9	Health services	13	10
10	High-tech communications	14	15
11	Electronics, Computers, Communication services	29	29
12	Software services	64	60
13	Transportation	--	4
14	Trade - Retail and Wholesale	6	16
15	Business services	8	6
16	Entertainment	--	1
17	Miscellaneous services	7	10
	TOTAL	178	178
	High-Tech (includes 8, 10, 11 and 12)	122	113
		68.54%	63.48%
	Non High-Tech	56	65
		31.46%	36.52%

Table 3

The acquisition sample period is 1991-2001. Acquisitions must have a relative deal size (deal size divided by acquirer's market value of equity one month prior to the acquisition announcement) of at least 10%. Panels A, B and C compare VC backed to non VC-backed targets. Non-VC backed targets are selected based on propensity score matching. Acquirer size is measured by the market value of acquirer equity one month prior to acquisition announcement. Target size is the price paid for acquisition of the target. A standard t test for a difference in means and Wilcoxon test for a difference in medians are used to compare VC-backed and non-VC backed targets. Propensity score matching is undertaken across the following deal characteristics: deal size, method of payment, relative deal size and target technology status.

Panel A: Comparison of Acquirer and Target Size

	VC-Backed Targets		Non VC-Backed Targets		Tests of Equality (p-values)	
	Mean	Median	Mean	Median	Mean	Median
Acquirer Size ($ million)	851	238	697	268	0.47	0.97
Target Size ($ million)	195	63	176	62	0.70	0.72
Target Size relative to Acquirer Size	0.39	0.23	0.34	0.22	0.32	0.83

Panel B: Frequency of Deal Financing Methods

	VC-Backed Targets		Non VC-Backed Targets		Tests of Equality (p-values)
	Number	%	Number	%	
All Cash	35	20%	35	20%	1.00
Stock	143	80%	143	80%	1.00
All Stock	112	63%	96	54%	0.20
Mixed	31	17%	47	26%	0.13
Total	178	100%	178	100%	

Panel C: Target Total Assets and Purchase Price to Book Value

	VC-Backed Targets		Non VC-Backed Targets		Tests of Equality (p-values)	
	Mean	Median	Mean	Median	Mean	Median
Target Total Assets (Book Value in $M)	28.25	12.25	72.88	12.18	0.13	0.55
Purchase Price to Book Value (Target Size to Target Total Assets)	17.85	5.09	20.78	3.94	0.71	0.26
Number of Acquisitions	165		154			

Table 4

Acquirer CARs for Purchases of Private Targets: Method of Payment and VC Backing

Cumulative Abnormal Returns (CARs) for acquirer stocks are calculated over the five trading days (-2, 2) around the acquisition announcement (day 0). Abnormal returns are estimated using a market adjusted return model: $r_i - r_m$ where r_i is the return on the acquirer's stock i and r_m is the value-weighted market (CRSP index) return. The sample period is 1991-2001. All acquirers are publicly traded firms listed on the NYSE, NASDAQ or AMEX with a stock price of two dollars or greater around the acquisition announcement. Acquisitions must have a relative deal size (deal size divided by acquirer's market value of equity one month prior to the acquisition announcement) of at least 10%. The matched sample of non VC-backed targets is extracted from a universe of all privately held targets on the basis of industry, method-of-payment, deal size and relative deal size. Panel A presents acquirer CARs for the full sample by the method of payment. Panel B displays results for the full sample for venture capital (VC) backed targets and non VC-backed targets. Panels C and D present the abnormal returns classified both by method of payment and VC-backing. Mixed offers (those with both cash and stock consideration) are combined with pure stock offers under the heading 'Stock Offers'. Medians and Wilcoxon test statistics for a significant difference are shown in parentheses. ***, ** and * denote significance at 1, 5 and 10 percent levels respectively.

	Number of Observations	Average (median) Acquirer CAR	Test of Equality of means (medians) p-values	Percent positive
Panel A Full Sample				
Stock Acquisitions	286	5.37% (3.49%)	0.559 (0.952)	66.08%
Cash Acquisitions	70	4.22% (3.48%)		61.43%
Panel B Full Sample				
VC-backed targets	178	7.82% (5.89%)	0.001*** (0.001)***	70.79%
Non VC-backed targets	178	2.46% (1.80%)		59.55%
Panel C Stock Offers				
VC-backed targets	143	8.23% (5.82%)	0.002*** (0.005)***	70.63%
Non VC-backed targets	143	2.51% (1.95%)		61.54%
Panel D Cash Offers				
VC-backed targets	35	6.17% (7.10%)	0.140 (0.094)*	71.43%
Non VC-backed targets	35	2.27% (1.38%)		51.43%

Table 5
Analysis of Acquirer CARs for VC-backed and Non VC-backed Targets

The table reports ordinary least squares estimates. The dependent variable is the Cumulative Abnormal Return (CAR) for the acquirer stock and is calculated over the five trading days (-2, 2) around the acquisition announcement (day 0). Abnormal returns are estimated using a market adjusted return model: $r_i - r_m$ where r_i is the return on the acquirer's stock i and r_m is the value-weighted market (CRSP index) return. The sample period is 1991-2001. The sample represents matched pairs of privately held acquisitions, half of which are VC-backed and the other half are non VC-backed, where propensity score matching is used to choose the non VC-backed matching acquisition. Stock Acquisition is an indicator for common stock financed transactions (includes mixed offers - targets acquired through a combination of cash and stock). The second indicator variable denotes whether or not the target is VC-backed. Log of Acquirer Size (equity market value measured one month prior to the acquisition announcement) and Relative Deal Size (deal size divided by acquirer size) are included separately in the regression. Intra-Industry Deal is an indicator variable denoting whether the target and acquirer firms belong to the same industry based on matches at the 2-digit level of their SIC codes. The following indicator variable denotes whether the target belongs to a high-tech industry. High-tech industries include: biological products, pharmaceuticals, genetics, software services, electronic equipment, computers, communication services and high-tech communications. Target Industry Market to Book denotes the median value of market to book ratio in target firm's industry in the year of takeover announcement. Acquirer Stock Return Volatility denotes standard deviation of acquirer's excess stock returns measured from trading days -6 to -270 prior to the announcement date (day 0). P-values based on White (1980) heteroscedastic-consistent standard errors adjusted for announcement year clustering are reported in brackets next to the parameter estimates. The symbols ***, ** and * denote significance at 1, 5 and 10 percent levels respectively.

	CAR		CAR		CAR		CAR	
							Stock Offers	
	(1)		(2)		(3)		(4)	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Stock Acquisition	0.013	[0.436]			0.014	[0.396]		
VC-backed Target			0.046	[0.001]***	0.046	[0.001]***	0.050	[0.003]***
Log of Acquirer Size	-0.003	[0.565]	-0.003	[0.556]	-0.003	[0.512]	-0.002	[0.741]
Relative Deal Size	0.060	[0.005]***	0.056	[0.011]**	0.057	[0.009]***	0.085	[0.008]***
Intra-Industry Deal	-0.013	[0.411]	-0.011	[0.501]	-0.010	[0.534]	-0.009	[0.598]
High-tech Target	-0.005	[0.757]	-0.003	[0.835]	-0.006	[0.734]	0.002	[0.926]
Target Industry Market to Book	-0.011	[0.259]	-0.011	[0.270]	-0.011	[0.267]	-0.014	[0.232]
Acquirer Stock Return Volatility	1.226	[0.025]**	1.155	[0.031]**	1.123	[0.034]**	1.131	[0.052]*
Intercept	0.006	[0.903]	-0.005	[0.920]	-0.012	[0.816]	-0.018	[0.771]
Adjusted R^2	4.92%		7.24%		7.11%		7.67%	
Number of Observations:	356		356		356		286	

Table 6
Acquirer CARs in Purchases of VC Backed Targets

Differences based on *VC Liquidity, Grandstanding, Moral Hazard, CVC strategic focus & VC Acquisition Currency*

Cumulative Abnormal Returns (CARs) for acquirer stocks are calculated over the five trading days (-2, 2) around the acquisition announcement (day 0). Abnormal returns are estimated using a market adjusted return model: $r_i - r_m$ where r_i is the return on the acquirer's stock i and r_m is the value-weighted market (CRSP index) return. The sample period is 1991-2001. All acquirers are publicly traded firms listed on the NYSE, NASDAQ or AMEX with a stock price of two dollars or greater around the acquisition announcement. Acquisitions must have a relative deal size (deal size divided by acquirer's market value of equity one month prior to the acquisition announcement) of at least 10%. Panel A displays results for VC funds distant from or close to liquidation. Panel B presents results for VC firms by their VC industry experience. Panel C displays results for deals that are likely to suffer from VC moral hazard because of dual financial relationships on the VCs' part through presence of equity stake in both the firms associated with the merger. Panel D presents the results classified by presence (or absence) of a corporate venture capitalist in the VC syndicate. Panel E presents the statistics classified by acquisition currency. Medians and Wilcoxon test statistics for a significant difference are shown in parentheses. The symbols ***, ** and * denote significance at 1, 5 and 10 % levels respectively.

	Number of observations	Average (median) excess return	Test of Equality of means (medians) p-values	Percent positive
Panel A VC Liquidity				
Targets backed by VC funds far from liquidation (top one third)	57	7.74% (4.24%)	0.941 (0.679)	63.16%
Targets backed by VC funds nearer liquidation	114	7.96% (6.45%)		74.33%
Panel B VC Grandstanding				
Targets backed by VCs with less experience (bottom one third)	58	9.39% (6.10%)	0.389 (0.609)	70.69%
Targets backed by more experienced VCs	117	6.96% (5.04%)		70.94%
Panel C VC Moral Hazard				
VCs with known conflicts of interest	25	14.93% (12.07%)	0.026** (0.021)**	84.00%
VCs with no known conflicts of interest	153	6.59% (4.80%)		68.63%
Panel D CVC Strategic Focus				
Targets with CVC backing	38	15.91% (9.53%)	0.001*** (0.028)**	76.32%
Targets without CVC backing	140	5.55% (4.39%)		69.29%
Panel E VC Acquisition Currency				

Cash Offers	35	6.17% (7.10%)	0.548 (0.907)	71.43%
Stock Offers	143	8.15% (5.50%)		70.63%

Table 7

Analysis of Acquirer CARs to Announcements of Purchases of VC-backed Targets

The table reports ordinary least squares estimates. The dependent variable CAR is the 5-day cumulative abnormal return; excess over the value weighted CRSP market return. The sample period is 1991-2001. VC Liquidity is an indicator variable denoting a third of the funds (in our sample) farthest from liquidation and is based on the time interval between the acquisition announcement date and the initial closing date of the VC fund. VC Grandstanding is an indicator variable denoting a third of the least experienced VC funds in our sample and is based on the age of the lead VC firm at the time of takeover announcement. The VC Moral Hazard Indicator denotes presence of VC conflict of interest which occurs when the VC has a dual financial relationship with the target and acquirer through share holdings in both. The CVC strategic focus indicates that the VC syndicate includes a corporate venture capitalist. Stock Acquisition indicates that the acquisition currency includes common stock. The control variables include the log of Acquirer Size (equity market value measured one month prior to the announcement), Relative Deal Size (deal size divided by acquirer size), Intra-industry Deal indicator denoting that the target and acquirer belong to the same industry, High-tech Target indicator denoting that the target is in a high-technology industry, Target Industry Market-to-Book ratio, and Acquirer Stock Return Volatility. Target and acquirer firms belong to the same industry if they have the same 2-digit SIC code. High technology industries include: biological products, pharmaceuticals, genetics, software services, electronic equipment, computers, communication services and high-tech communications. Acquirer Stock Return Volatility is measured by the standard deviation of acquirer's excess stock returns estimated over trading days -6 to -270 days prior to the announcement date (day 0). P-values based on White (1980) heteroscedastic-consistent standard errors adjusted for VC firm and announcement year clustering are reported in brackets next to the parameter estimates. The symbols ***, ** and * denote significance at the 1, 5 and 10 percent levels respectively.

	CAR (1)		CAR (2)		CAR (3)		CAR (4)		CAR (5)		CAR (6)	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
VC Liquidity	-0.034	[0.29]									-0.042	[0.20]
VC Grandstanding			0.023	[0.41]							0.022	[0.45]
VC Moral Hazard					0.069	[0.04]**					0.069	[0.04]**
CVC Strategic Focus							0.084	[0.06]*			0.095	[0.05]**
Stock Acquisition									0.014	[0.57]	0.019	[0.48]
Log of Acquirer Size	-0.008	[0.69]	-0.004	[0.83]	-0.005	[0.78]	-0.013	[0.48]	-0.007	[0.72]	-0.013	[0.50]
Relative Deal Size	0.051	[0.08]*	0.043	[0.11]	0.038	[0.10]*	0.029	[0.33]	0.044	[0.09]*	0.033	[0.22]
Intra-Industry Deal	0.001	[0.97]	-0.001	[0.98]	-0.007	[0.77]	0.008	[0.72]	-0.001	[0.96]	0.011	[0.62]
High-tech Target	-0.012	[0.67]	-0.006	[0.83]	-0.007	[0.77]	-0.013	[0.65]	-0.008	[0.78]	-0.026	[0.42]
Target Industry Market to Book	-0.024	[0.14]	-0.019	[0.20]	-0.021	[0.16]	-0.022	[0.14]	-0.021	[0.16]	-0.027	[0.10]*
Acquirer Stock Return Volatility	2.832	[0.02]**	2.443	[0.02]**	2.359	[0.02]**	2.044	[0.02]**	2.416	[0.02]**	2.358	[0.02]**
Intercept	-0.008	[0.93]	-0.025	[0.76]	-0.009	[0.91]	0.016	[0.85]	-0.015	[0.85]	-0.006	[0.94]
Adjusted R^2	7.58%		5.97%		7.79%		9.36%		5.93%		11.90%	
Number of Observations:	170		175		178		178		178		168	

TABLE 8

Corporate and Traditional Venture Investments Before and After Acquisitions of Portfolio Firms

The statistics are based on venture investments made between 1985 and 2004. Panel A reports the ratio of the CVC and TVC number of investments in the years preceding to the years following a portfolio acquisition. Investments for up to six years are measured symmetrically on both sides of the acquisition year. For example, if a CVC backed target is acquired in year 2001, then the CVC's number of investments in the years 2002-2004 are compared to its number of investment in the years 1999-2001. Panel B presents test statistics for the equality of the CVC and TVC ratios of pre- to post-acquisition number of investments. Panel C reports the ratios of CVC and TVC dollar investment levels in years prior to and following a portfolio acquisition. Panel D presents test statistics for the equality of CVC and TVC ratios of pre- to post-acquisition dollar investments. Panel E presents the correlation between acquirer CAR and an indicator variable denoting reduction in post-acquisition CVC investments. The symbols ***, ** and * denote significance at 1, 5 and 10 percent levels respectively.

Panel A CVC and TVC Ratios of Pre- to Post-Acquisition *Number* of Investments

	Mean	Median	% of All VC Programs
CVCs Reducing Investments	3.09	4.10	59.60%
CVCs Increasing Investments	0.26	0.44	40.40%
Overall Change in CVC Number of Investments	0.55	1.41	100.00%
TVCs Reducing Investments	2.64	3.14	40.80%
TVCs Increasing Investments	0.33	0.51	59.20%
Overall Change in TVC Number of Investments	0.51	0.83	100.00%

Panel B Tests for Equality of CVC and TVC Ratios of Pre- to Post-Acquisition *Number* of Investments

	Mean (t-test)	Median (Wilcoxon)
p-values	0.80	0.01***

Panel C	CVC and TVC Ratios of Pre- to Post-Acquisition *Dollar* Investments		
	Mean	Median	% of All Programs
CVCs Reducing Investments	5643.21	30.37	58.80%
CVCs Increasing Investments	0.32	0.29	41.20%
Overall Change in CVC Dollar Investments	3319.67	1.87	100.00%
TVCs Reducing Investments	2227.20	2.84	36.18%
TVCs Increasing Investments	0.38	0.31	63.82%
Overall Change in TVC Dollar Investments	806.02	0.56	100.00%

Panel D	Tests for Equality of CVC and TVC Ratios of Pre- to Post-Acquisition *Dollar* Investments	
	Mean (t-test)	Median (Wilcoxon)
p-values	0.00***	0.01***

Panel E	Correlation between Acquirer CARs and an Indicator Denoting Reduced Post-Acquisition CVC Activity	
	Indicator denoting Reduction in CVC *Number* of Investments	Indicator denoting Reduction in CVC *Dollar* Investments
Acquirer CAR	0.23**	0.25**

Table 9

Purchase Price to Book Value Ratio for VC Backed Targets

Differences based on *VC Liquidity, Grandstanding, Moral Hazard, CVC strategic focus & VC Acquisition Currency*

The sample period is 1991-2001. All acquirers are publicly traded firms listed on the NYSE, NASDAQ or AMEX with a stock price of two dollars or greater around the acquisition announcement. Acquisitions must have a relative deal size (deal size divided by acquirer's market value of equity one month prior to the acquisition announcement) of at least 10%. Panel A displays results for VC funds distant from or close to liquidation. Panel B displays results for VC firms by their VC industry experience. Panel C displays results for deals that are likely to suffer from VC moral hazard because of dual financial relationships on the VCs' part through equity stakes in both the target and acquirer. Panel D presents the results classified by presence (or absence) of a corporate venture capitalist in the VC syndicate. Panel E presents the statistics classified by acquisition currency. Medians and the Wilcoxon test statistics for a significant difference are shown in parentheses. The symbols ***, ** and * denote significance at 1, 5 and 10 percent levels respectively.

	Number of Observations	Mean (Median) Purchase Price to Book Value Ratio	Test of Equality of means (medians) p-values
Panel A VC Liquidity			
Targets backed by VC funds far from liquidation (top one third)	54	35.59 (13.21)	0.002*** (0.002)***
Targets backed by VC funds nearer liquidation	105	9.37 (4.01)	
Panel B VC Grandstanding			
Targets backed by less experienced VCs (bottom one-third)	54	14.25 (5.16)	0.491 (0.242)
Targets backed by more experienced VCs	108	20.04 (5.15)	
Panel C VC Moral Hazard			
Targets backed by VCs with acquirer stock	24	8.47 (2.98)	0.033** (0.098)*
Targets backed by VCs without acquirer stock	141	19.45 (5.50)	
Panel D CVC Strategic Focus			
Targets with CVC backing	34	23.30 (9.95)	0.476 (0.006)***
Targets without CVC backing	131	16.44 (4.52)	

Panel E Acquisition Currency			
Cash Offers	29	5.22 (1.88)	0.002*** (0.000)***
Stock Offers	136	20.54 (6.77)	

Table 10

Analysis of the Ratio of Purchase Price to Book Value of Assets of VC-Backed Targets

The table reports ordinary least squares estimates. The dependent variable is the log of the ratio of purchase price to book value of total assets of the target firm. The sample period is 1991-2001. VC Liquidity is an indicator variable denoting a third of the funds (in our sample) farthest from liquidation and is based on the time interval between the acquisition announcement date and the initial closing date of the VC fund. VC Grandstanding is an indicator variable denoting a third of the least experienced VC funds in our sample and is based on the age of the lead VC firm at the time of acquisition announcement. The VC Moral Hazard Indicator denotes presence of VC conflict of interest which occurs when the VC has a dual financial relationship with both the target and acquiring firms through share holdings in both. The CVC strategic focus indicates that the VC syndicate includes a corporate venture capitalist. Stock Acquisition indicates that the acquisition currency includes common stock. The control variables include Relative Deal Size (deal size divided by acquirer's market value of equity one month prior to acquisition announcement), Intra-industry Deal indicator denoting that the target and acquirer belong to the same industry and High-tech Target indicator denoting that the target is in a high-technology industry. Target and acquirer firms belong to the same industry if they have the same 2-digit SIC code. High technology industries include: biological products, pharmaceuticals, genetics, software services, electronic equipment, computers, communication services and high-tech communications. The last three control variables are the Target Industry Market-to-Book Ratio, Acquirer Stock Return Volatility, and a 1999-2000 Indicator denoting acquisitions occurring in the "Bubble" period of late nineteen nineties. Acquirer Stock Return Volatility is measured by the standard deviation of acquirer's excess stock returns estimated over trading days -6 to -270 prior to the announcement date (day 0). P-values based on White (1980) heteroscedastic-consistent standard errors adjusted for VC firm and announcement year clustering are reported in brackets next to the parameter estimates. The symbols ***, ** and * denote significance at the 1, 5 and 10 percent levels respectively.

	Log (P/B) (1)		Log (P/B) (2)		Log (P/B) (3)		Log (P/B) (4)		Log (P/B) (5)		Log (P/B) (6)	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
VC Liquidity	0.30	[0.00]***									0.33	[0.00]***
VC Grandstanding			-0.04	[0.65]							-0.11	[0.20]
VC Moral Hazard					-0.23	[0.01]***					-0.27	[0.01]***
CVC Strategic Focus							0.09	[0.50]			0.09	[0.46]
Stock Acquisition									0.28	[0.01]***	0.26	[0.01]***
Relative Deal Size	-0.01	[0.92]	0.03	[0.72]	0.06	[0.51]	0.03	[0.77]	0.04	[0.65]	0.05	[0.64]
Intra-Industry Deal	-0.10	[0.25]	-0.11	[0.20]	-0.07	[0.40]	-0.07	[0.41]	-0.06	[0.49]	-0.06	[0.48]
High-tech Target	0.33	[0.00]***	0.34	[0.00]***	0.34	[0.00]***	0.33	[0.00]***	0.30	[0.00]***	0.31	[0.00]***
Target Industry Market to Book	0.18	[0.01]***	0.15	[0.01]***	0.16	[0.00]***	0.16	[0.01]***	0.15	[0.01]***	0.16	[0.01]***
Acquirer Stock Return Volatility	3.92	[0.07]*	5.37	[0.02]**	5.36	[0.01]**	4.72	[0.04]**	4.12	[0.05]**	3.11	[0.18]
1999-2000 Period	0.06	[0.53]	0.15	[0.11]	0.16	[0.08]*	0.16	[0.10]*	0.19	[0.04]**	0.05	[0.56]
Intercept	-0.01	[0.94]	0.03	[0.76]	-0.01	[0.92]	-0.01	[0.99]	-0.17	[0.13]	-0.12	[0.31]
Adjusted R^2	31.9%		28.7%		30.8%		29.3%		31.8%		36.8%	
Number of Observations:	158		162		165		165		165		157	

Table 11

Analysis of Acquirer CARs for VC-backed and Non VC-backed Targets in a Heckman Selection Framework

The dependent variable is the Cumulative Abnormal Return (CAR) for the acquirer stock and is calculated over the five trading days (-2, 2) around the acquisition announcement (day 0). Abnormal returns are estimated using a market adjusted return model: $r_i - r_m$ where r_i is the return on the acquirer's stock i and r_m is the value-weighted market (CRSP index) return. The sample period is 1991-2001. The sample represents acquisitions of privately held VC backed and non-VC backed companies. Stock Acquisition is an indicator for common stock financed transactions (includes mixed offers - targets acquired through a combination of cash and stock). The second indicator variable denotes whether or not the target is VC-backed. Log of Acquirer Size (equity market value measured one month prior to the acquisition announcement) and Relative Deal Size (deal size divided by acquirer size) are included separately in the regression. Intra-Industry Deal is an indicator variable denoting whether the target and acquirer firms belong to the same industry based on matches at the 2-digit level of their SIC codes. The following indicator variable denotes whether the target belongs to a high-tech industry. High-tech industries include: biological products, pharmaceuticals, genetics, software services, electronic equipment, computers, communication services and high-tech communications. Target Industry Market to Book denotes the median value of market to book ratio in target firm's industry in the year of takeover announcement. Acquirer Stock Return Volatility denotes standard deviation of acquirer's excess stock returns measured from trading days -6 to -270 prior to the announcement date (day 0). The inverse mills' ratio derived from the first stage logit estimation is added to account for selection bias, if any. Additional explanatory variables used in the estimation of logistic equation predicting VC backed targets are the aggregate IPO proceeds in the most recent three months including the month of the M&A announcement, aggregate VC investment in the most recent three months including the month of the M&A announcement, and indicator variables for target locations. P-values based on White (1980) heteroscedastic-consistent standard errors adjusted for VC firm and announcement year clustering are reported in brackets next to the parameter estimates. The symbols ***, ** and * denote significance at 1, 5 and 10 percent levels respectively.

	Prob. (VC backed target=1)	CAR	CAR	CAR
		(1)	(2)	(3)
	Coeff. p-value	Coeff. p-value	Coeff. p-value	Coeff. p-value
Stock Acquisition		0.021 [0.001]***		0.021 [0.001]***
VC-backed Target			0.111 [0.043]**	0.109 [0.047]**
Log of Acquirer Size		-0.008 [0.004]***	-0.009 [0.001]***	-0.009 [0.001]***
Relative Deal Size		0.044 [0.003]***	0.045 [0.003]***	0.044 [0.003]***
Intra-Industry Deal		-0.013 [0.044]**	-0.013 [0.037]**	-0.013 [0.045]**
High-tech Target	1.070 [0.000]***	0.022 [0.034]**	0.019 [0.088]*	0.016 [0.139]
Target Industry Market to Book		-0.003 [0.679]	-0.003 [0.600]	-0.005 [0.394]
Acquirer Stock Return Volatility		0.033 [0.563]	0.041 [0.488]	0.029 [0.606]

Inverse Mills' Ratio			0.008	[0.058]*	-0.030	[0.050]**	-0.030	[0.047]**
Aggregate IPO Proceeds in the recent 3 months	0.021	[0.033]**						
VC Industry Investment in the recent 3 months	0.031	[0.003]***						
California Target	0.421	[0.033]**						
Massachusetts Target	1.431	[0.000]***						
Texas Target	0.213	[0.513]						
New York Target	-0.536	[0.220]						
Intercept	-3.718	[0.000]***	0.055	[0.000]***	0.069	[0.000]***	0.062	[0.000]***
Log Likelihood /Adj. R^2	-562.26		5.62%		5.54%		5.86%	
Number of Observations:	2292		2292		2292		2292	

Table 12

Analysis of Acquirer CARs and Purchase Price to Book Value Ratio of VC backed Targets in a Two-Equation Simultaneous System

In the first equation, the dependent variable CAR is the 5-day cumulative abnormal return; excess over the value weighted CRSP market return. In the second equation, the dependent variable is the log of the ratio of the purchase price to book value of target's assets. The sample period is 1991-2001. VC Liquidity is an indicator variable denoting a third of the funds (in our sample) farthest from liquidation and is based on the time interval between the acquisition announcement date and the initial closing date of the VC fund. VC Grandstanding is an indicator variable denoting a third of the least experienced VC funds in our sample and is based on the age of the lead VC firm at the time of takeover announcement. The VC Moral Hazard Indicator denotes presence of VC conflict of interest which occurs when the VC has a dual financial relationship with both the target and acquirer through share holdings in both. The CVC strategic focus indicates that the VC syndicate includes a corporate venture capitalist. Stock Acquisition indicates that the acquisition currency includes common stock. The control variables include Acquirer Size measured by market value of acquirer's equity one month prior to the acquisition announcement, Relative Deal Size (deal size divided by acquirer size), Intra-industry Deal indicator denoting that the target and acquirer belong to the same industry and High-tech Target indicator denoting that the target is in a high-technology industry. Target and acquirer firms belong to the same industry if they have the same 2-digit SIC code. High technology industries include: biological products, pharmaceuticals, genetics, software services, electronic equipment, computers, communication services and high-tech communications. The last three control variables are the Target Industry Market-to-Book Ratio, Acquirer Stock Return Volatility, and a 1999-2000 Indicator denoting acquisitions occurring in the "Bubble" period of late nineteen nineties. Acquirer Stock Return Volatility is measured by the standard deviation of acquirer's excess stock returns estimated over trading days -6 to – 270 prior to the announcement date (day 0). P-values based on White (1980) heteroscedastic-consistent standard errors are reported in brackets next to the parameter estimates. The symbols ***, ** and * denote significance at the 1, 5 and 10 percent levels respectively.

	CAR		Log(P/B)		CAR		Log (P/B)		CAR		Log (P/B)	
	(1)				(2)				(3)			
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
VC Liquidity	-0.033	[0.25]	0.26	[0.00]***								
VC Grandstanding					0.016	[0.52]	-0.01	[0.89]				
VC Moral Hazard									0.065	[0.05]**	-0.17	[0.06]*
CVC strategic focus												
Stock Acquisition												
Log of Acquirer Size	0.002	[0.83]			0.001	[0.91]			-0.003	[0.74]		
Relative Deal Size	0.081	[0.02]**	-0.08	[0.47]	0.063	[0.05]**	-0.01	[0.96]	0.046	[0.09]*	0.03	[0.77]
Intra-Industry Deal	0.004	[0.85]	-0.03	[0.68]	0.001	[0.97]	-0.07	[0.40]	0.006	[0.80]	-0.04	[0.59]
High-Tech Target	-0.003	[0.92]	0.39	[0.00]***	0.006	[0.81]	0.38	[0.00]***	0.009	[0.68]	0.37	[0.00]***
Target Industry Market to Book	-0.029	[0.09]*	0.15	[0.01]***	-0.026	[0.11]	0.16	[0.00]***	-0.022	[0.14]	0.18	[0.00]***
Acquirer Stock Return Volatility	3.316	[0.00]***	4.57	[0.03]**	2.922	[0.01]***	5.75	[0.01]***	1.884	[0.01]***	5.51	[0.01]***
1999-2000 Period			0.14	[0.10]*			0.21	[0.01]***			0.17	[0.04]**
Log (P/B)	-0.028	[0.36]			-0.036	[0.24]			-0.010	[0.72]		
Intercept	-0.086	[0.39]	0.18	[0.21]	-0.041	[0.66]	-0.10	[0.35]	0.000	[0.99]	-0.09	[0.37]
Adjusted R-squared	7.55%		31.21%		5.54%		27.45%		6.60%		30.11%	
Number of Observations:	159				162				165			

	CAR		Log(P/B)		CAR		Log (P/B)		CAR		Log (P/B)	
	(4)				(5)				(6)			
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
VC Liquidity									-0.022	[0.43]	0.29	[0.00]***
VC Grandstanding									0.018	[0.43]	-0.10	[0.27]
VC Moral Hazard									0.064	[0.05]**	-0.26	[0.01]***
CVC Strategic Focus	0.081	[0.04]**	0.07	[0.57]					0.094	[0.02]**	0.08	[0.42]
Stock Acquisition					0.033	[0.21]	0.24	[0.02]**	0.012	[0.68]	0.29	[0.01]***
Log of Acquirer Size	-0.004	[0.71]			0.005	[0.59]			-0.004	[0.64]		
Relative Deal Size	0.055	[0.10]*	-0.01	[0.99]	0.073	[0.01]***	0.04	[0.67]	0.067	[0.04]**	-0.01	[0.94]
Intra-Industry Deal	0.017	[0.43]	-0.03	[0.72]	0.009	[0.70]	0.01	[0.95]	0.025	[0.25]	0.01	[0.96]
High-Tech Target	-0.001	[0.95]	0.37	[0.00]***	0.003	[0.90]	0.34	[0.00]***	-0.019	[0.49]	0.30	[0.00]***
Target Industry Market to Book	-0.023	[0.14]	0.18	[0.00]***	-0.023	[0.15]	0.17	[0.00]***	-0.026	[0.12]	0.14	[0.01]***
Acquirer Stock Return Volatility	2.143	[0.01]***	4.68	[0.03]**	2.866	[0.00]***	3.73	[0.06]*	2.367	[0.01]***	3.84	[0.07]*
1999-2000 Period			0.21	[0.02]**			0.24	[0.00]***			0.13	[0.12]
Log (P/B)	-0.032	[0.24]			-0.048	[0.09]*			-0.015	[0.59]		
Intercept	0.003	[0.97]	-0.12	[0.27]	-0.086	[0.30]	-0.27	[0.02]**	-0.051	[0.53]	0.10	[0.54]
Adjusted R-squared	9.23%		28.16%		5.16%		30.61%		10.97%		36.60%	
Number of Observations:	166				165				157			

Table 13

Analysis of the Purchase Price to Book Value Ratio and Likelihood of Stock Financing for VC-Backed Targets in a Two-Equation Simultaneous System

The dependent variable is the log of the ratio of purchase price to book value of total assets of the target firm – log P/B. The sample period is 1991-2001. VC Liquidity is an indicator variable denoting a third of the funds (in our sample) farthest from liquidation and is based on the time interval between the acquisition announcement date and the initial closing date of the VC fund. The VC Moral Hazard Indicator denotes presence of VC conflict of interest which occurs when the VC has a dual financial relationship with the target and acquirer through share holdings in both. VC Grandstanding is an indicator variable denoting a third of the least experienced VC funds in our sample and is based on the age of the lead VC firm at the time of takeover announcement. The CVC strategic focus indicates that the VC syndicate includes a corporate venture capitalist. Stock Acquisition indicates that the acquisition currency includes common stock. The control variables include Relative Deal Size (deal size divided by acquirer size), Intra-industry Deal indicator denoting that the target and acquirer belong to the same industry and High-tech Target indicator denoting that the target is in a high-technology industry. Target and acquirer firms belong to the same industry if they have the same 2-digit SIC code. High technology industries include: biological products, pharmaceuticals, genetics, software services, electronic equipment, computers, communication services and high-tech communications. The last three control variables are the Target Industry Market-to-Book Ratio, Acquirer Stock Return Volatility and a 1999-2000 Indicator denoting acquisitions occurring in the "Bubble" period of late nineteen nineties. Acquirer Stock Return Volatility is measured by the standard deviation of acquirer's excess stock returns estimated over trading days -6 to -270 prior to the announcement date (day 0). In the joint estimation of second equation, which explains the likelihood of a stock offer, we add log P/B and Acquirer Size (market value of acquirer's equity one month prior to the acquisition announcement) as additional explanatory variables. P-values based on White (1980) heteroscedastic-consistent standard errors are reported in parentheses beneath the parameter estimates. The symbols ***, ** and * denote significance at the 1, 5 and 10 percent levels respectively.

	Log (P/B)	Pr (Stock)	Log (P/B)	Pr (Stock)	Log(P/B)	Pr (Stock)
	(1)		(2)		(3)	
	Coeff. (p-value)	Coeff. (p-value)	Coeff. (p-value)	Coeff. (p-value)	Coeff. (p-value)	Coeff. (p-value)
VC Liquidity	0.34*** (0.00)				0.34*** (0.00)	
VC Moral Hazard			-0.25** (0.02)		-0.27*** (0.01)	
VC Grandstanding	-0.10 (0.21)		-0.05 (0.55)		-0.10 (0.20)	
CVC Strategic Focus	0.10 (0.33)		0.09 (0.39)		0.10 (0.33)	
Stock Acquisition	0.25** (0.02)		0.26*** (0.01)		0.26*** (0.01)	
Log of Acquirer Size		0.03 (0.89)		0.05 (0.83)		0.03 (0.89)
Relative Deal Size	0.01 (0.94)	-0.09 (0.87)	0.07 (0.45)	-0.08 (0.87)	0.04 (0.65)	-0.09 (0.87)
Intra-Industry Deal	-0.09 (0.28)		-0.05 (0.53)		-0.07 (0.39)	
High-tech Target	0.32*** (0.00)	0.53 (0.29)	0.31*** (0.00)	0.43 (0.39)	0.32*** (0.00)	0.53 (0.29)

Target Industry Market to Book	0.15*** (0.00)		0.14*** (0.01)		0.15*** (0.00)	
Acquirer Stock Return Volatility	2.90 (0.17)	25.19* (0.08)	4.25** (0.04)	26.77* (0.07)	3.11 (0.13)	25.19* (0.08)
1999-2000 Period	0.07 (0.48)	-0.88 (0.12)	0.16* (0.07)	-0.85 (0.13)	0.06 (0.49)	-0.87 (0.12)
Log (P/B)		1.20** (0.03)		1.21** (0.03)		1.20** (0.03)
Intercept	0.23 (0.18)	-0.53 (0.74)	-0.12 (0.41)	-0.62 (0.69)	0.22 (0.18)	-0.53 (0.74)
Log-likelihood	-169.08		-176.72		-165.77	
Observations:	157		162		157	

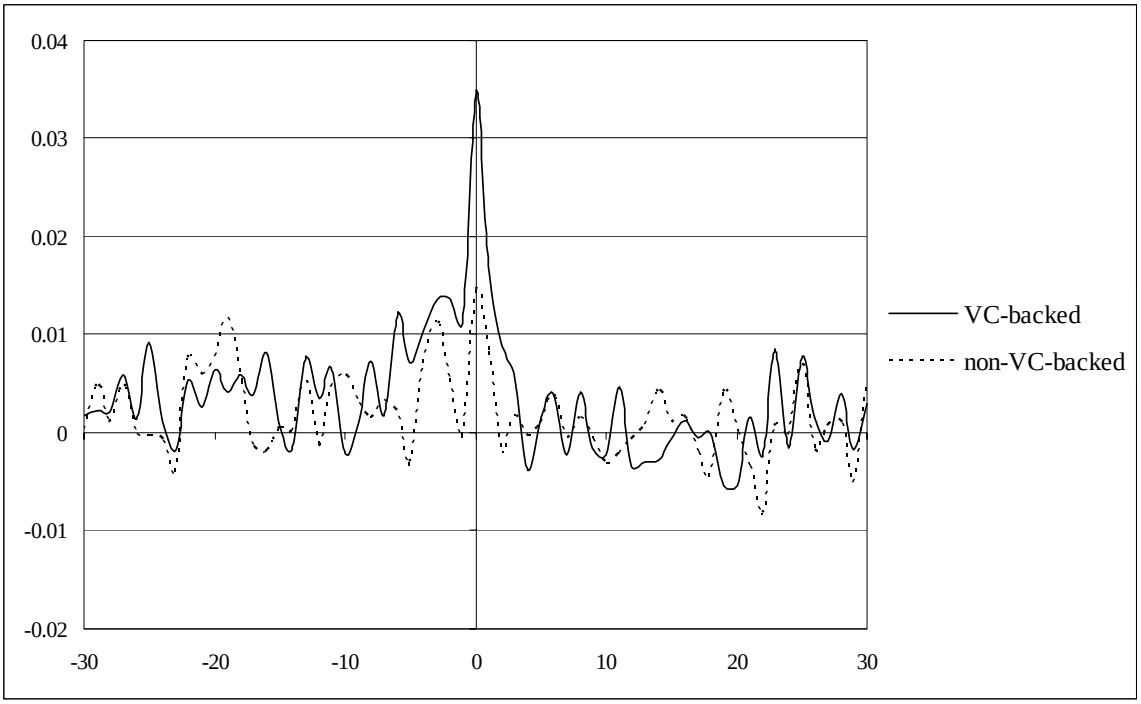

Figure 1A
Average Acquirer Returns for VC-backed and non-VC-backed Targets around the Announcement Day

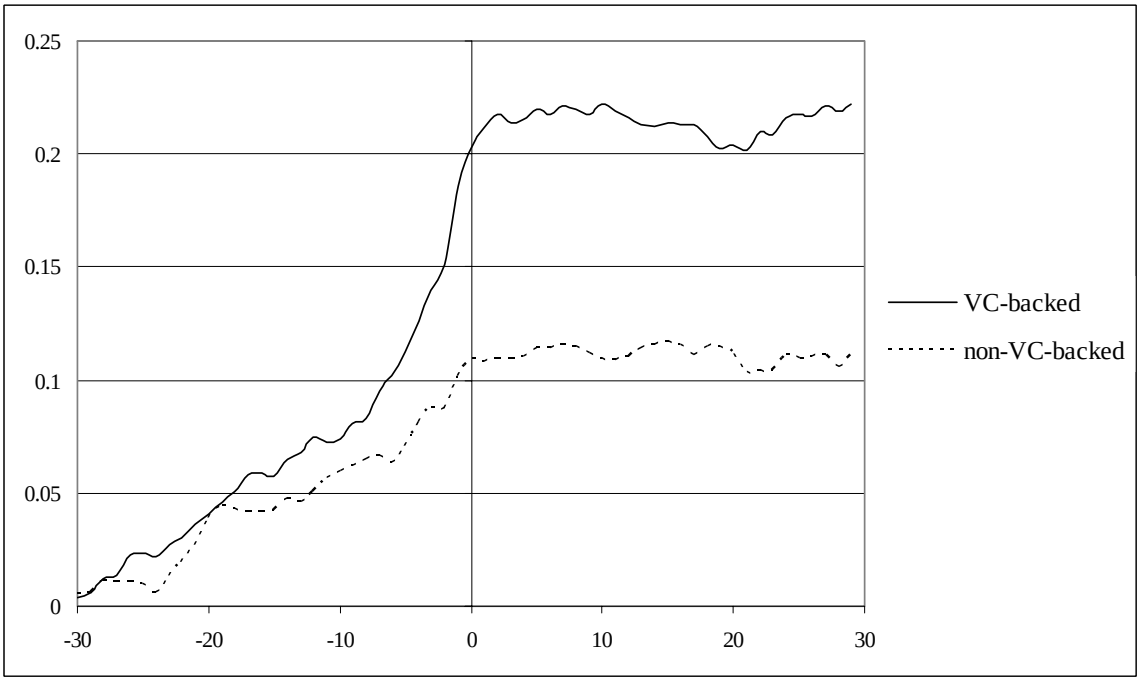

Figure 1B
Acquirer CARs for VC-backed and non-VC-backed Targets around the Announcement Day