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Renegotiation of cash flow rights in the sale of VC-backed firms ☆

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ABSTRACT

Incomplete contracting theory suggests that venture capitalist (VC) cash flow rights, including liquidation preferences, could be subject to renegotiation. Using a hand-collected data set of sales of Silicon Valley firms, we find common shareholders do sometimes receive payment before VCs' liquidation preferences are satisfied. However, such deviations from VCs' cash flow rights tend to be small. We also find that renegotiation is more likely when governance arrangements, including the firm's choice of corporate law, give common shareholders more power to impede the sale. Our study provides support for incomplete contracting theory, improves understanding of VC exits, and suggests that choice of corporate law matters in private firms.

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1. Introduction

Venture capitalists (VCs) typically invest through convertible preferred stock (Kaplan and Strömberg, 2003; Sahlman, 1990). The stock's liquidation preferences entitle VCs to be paid before common shareholders (including a firm's current managers, its founders, and other employees) when the firm is sold or dissolved (Barclay and Smith, 1995). If the firm is sold privately for a sufficiently high price or conducts an initial public offering (IPO), the VCs will convert their preferred stock into common stock at a pre-specified ratio (Hellmann, 2006).

However, VCs' cash flow rights could be subject to renegotiation in the most common form of exit: a private sale of the firm (Cumming, Fleming, and Schwienbacher, 2006). Managers and other common shareholders might use their positions on the board and other control rights to hold up a sale of the firm, particularly when satisfaction of the VCs' liquidation preferences would leave little for common shareholders. Incomplete contracting theory (Aghion and Bolton, 1992; Hart, 1995) suggests that this threat of holdup could lead VCs to carve out part of their cash flow rights for common stockholders (Hellmann, 2006).[1]

Unfortunately, there is little evidence on how VCs' cash flow rights perform in private sales. Are VCs' cash flow rights renegotiated in private sales, and, if so, are such renegotiations caused by common stockholders' holdup power?

To answer these questions, we use a hand-collected data set of 50 VC-backed Silicon Valley firms sold to acquirers in 2003 and 2004. These firms were all high-tech businesses, primarily in the biotech, telecommunications, software, and Internet sectors. Although the average sale price was $55 million, there was considerable variance in outcomes. Some sales were essentially liquidations, yielding only several hundred thousand dollars, while other firms were sold for well over $100 million. For each firm, we gather data on the allocation of control rights and cash flow rights from the initial VC financing to the sale. We then examine the distribution of sale proceeds among the VCs and the original common shareholders. We can thus compare VCs' cash flow rights at the time of sale to the amounts they receive.

We find that in most sales there is no renegotiation: VCs receive their full cash flow rights. In 11 of the sales, however, VCs carve out part of their cash flow rights for common shareholders. In these cases, all of which involve the VCs exiting as preferred shareholders, the average carveout is $3.7 million, approximately 11% of the VCs' cash flow rights. Across all 50 firms, the average carveout is 2.3% (1.9% dollar-weighted). Our study suggests that VCs' cash flow rights are generally reliable in private sales, even when the VCs exit as preferred shareholders and are most vulnerable to holdup.[2]

We also show that the likelihood and magnitude of deviations from VCs' cash flow rights in favor of common shareholders are larger when common shareholders have more power vis-à-vis the VCs. Everything else equal, the expected deviation is about $1.5 million larger if VCs lack a board majority and roughly $1.6 million larger if the state corporate law chosen by the firm gives common shareholders relatively more leverage against the VCs through that state's bundle of common shareholder rights. This suggests that such deviations are driven, at least in part, by the allocation of control within the firm.

Our findings linking common shareholder power to deviations from VCs' cash flow rights are generally robust to alternative econometric specifications. We estimate the sensitivity of our results to omitted variable bias using a technique developed by Altonji, Elder, and Taber (2005). Application of their technique to our study suggests that the relation between common shareholder power and deviations from VCs' cash flow rights is not spurious.

Our study makes several contributions. First, it sheds light on how VCs exit their investments through private sales. While researchers have extensively studied VC exits through IPOs (Barry, Muscarella, Peavy, and Vetsuypens, 1990; Megginson and Weiss, 1991; Lee and Wahal, 2004; Gompers, 1996) and theorized about private sales (Berglöf, 1994; Bascha and Walz, 2001; Hellmann, 2006), little is known about how VCs exit through these sales even though they are the most common form of VC exit. Our findings suggest that, when exiting through a sale, VCs generally have sufficient control to realize their full cash flow rights. However, VCs sometimes need to pay common shareholders to obtain their support for the proposed sale, and the likelihood of such renegotiation is higher when VCs have less control. Our findings are consistent with Hellmann (2006), who predicts that such renegotiations are more likely to occur in firms in which VCs lack complete control and exit holding preferred stock with liquidation preferences.

Second, our study provides support for the incomplete financial contracting literature, particularly Aghion and Bolton (1992). Aghion and Bolton show that investors might give entrepreneurs some holdup power to improve subsequent decision making. The investors might then need to give up part of their cash flow rights to the entrepreneur ex post to obtain support for an action favored by the investors, such as a sale of the firm.

[1] Renegotiation is sometimes seen in bankruptcy, where common shareholders can use their holdup power to extract part of creditors' cash flow rights. Studies finding deviations from creditors' contractual priority in bankruptcy proceedings include Warner (1977), Franks and Torous (1989), Weiss (1990), LoPucki and Whitford (1990), Eberhart, Moore, and Roenfeldt (1990), Betker (1995), and Tashjian, Lease, and McConnell (1996). Subsequent work suggests that these deviations result from equity's holdup power, the legal right of equityholders in Chapter 11 to delay or prevent the adoption of a plan of reorganization (Bebchuk and Chang, 1992; and Bebchuk, 2002). Bankruptcy distributions in jurisdictions that do not provide equity with similar holdup power are generally consistent with creditors' priority rights (Franks, Nyborg, and Torous, 1996; Davydenko and Franks, 2006).

[2] By contrast, in bankruptcy, where common shareholders can use their holdup power to extract part of creditors' cash flow rights, deviations from absolute priority are more common and of larger magnitude, with some studies finding deviations in approximately 70% of bankruptcy proceedings, and an average deviation of 7.6% (Weiss, 1990; Eberhart, Moore, and Roenfeldt, 1990).

Consistent with their model, we find that the parties allocate some holdup power to the entrepreneur and other common shareholders; there is sometimes renegotiation upon exit; the renegotiation involves the investors giving up part of their cash flow rights; and the renegotiation is driven, at least in part, by the pre-sale allocation of control rights. While other researchers (Kaplan and Strömberg, 2003) show how the allocation of control rights in start-ups is consistent with Aghion and Bolton (1992), our paper is the first to show that the allocation of control affects the likelihood and extent of deviation from VCs' cash flow rights in the direction predicted by their model.

Third, our study provides evidence that start-up firms' choice of corporate law matters. There is some evidence that differences in corporate law within the US and across countries affect the value of common stock in public companies (Daines, 2001; Subramanian, 2004; La Porta, Lopez-DeSilanes, Shleifer, and Vishny, 2002). However, no studies examine whether corporate law also affects financial outcomes in VC-backed firms or in any other type of private company. Our study is the first to suggest that the choice of corporate law matters in private firms. In particular, corporate law that gives common shareholders more leverage might enable them to increase their payouts ex post (at the expense of preferred shareholders) when the firm is sold.

Our study does not address the performance of VCs' cash flow rights generally. We do not examine VCs' ability to realize their cash flow rights in IPOs, where the payout to the original common shareholders is likely to be large, and holdup therefore less likely. We also do not consider the performance of VCs' cash flow rights in dissolutions (which are generally not publicly reported). We expect that, if such exits were included, the ex ante deviation from VCs' cash flow rights around exit would be even lower. Finally, we abstract from changes in VCs' cash flow rights that might take place long before exit. For example, VCs might agree to reduce their liquidation preferences to facilitate a new round of financing. We focus only on the performance of VCs' cash flow rights as of the time of private sale.

The remainder of this paper is organized as follows. Section 2 describes the potential conflict between VCs and common shareholders when a sale of the firm is contemplated. It also develops testable hypotheses regarding the effect of common shareholder power on VCs' ability to fully realize their cash flow rights in a sale. Section 3 describes our data set. Section 4 describes the deviations from VCs' cash flow rights observed in our sample. Section 5 tests ours hypotheses regarding the link between common shareholder power and such deviations, describes our findings, and offers robustness checks. Section 6 concludes.

2. VCs and common shareholders

We now describe the potential conflict between VCs and common shareholders around the sale of the firm, and we offer two hypotheses about how the allocation of control rights between VCs and common shareholders is likely to affect VCs' ability to realize their cash flow rights upon the sale of the firm.

2.1. VCs' cash flow and control rights

VCs invest in start-ups almost exclusively through convertible preferred stock while the founders and other employees hold common stock (Kaplan and Strömberg, 2003). In a liquidity event, such as the sale of the firm, VCs holding preferred stock are entitled to be paid the stock's liquidation preference in full before common shareholders receive anything. Alternatively, the VCs can convert their preferred stock into common stock at a pre-specified ratio and be paid as common shareholders. In some instances, VCs receive participating preferred stock, that entitles them to both receive a liquidation preference and share pro rata with common shareholders in any remaining value generated by the liquidity event, up to a specified amount. VCs holding convertible preferred stock, whether ordinary or participating, will choose to convert into common stock only if the firm is sold for a sufficiently high price. In most sales, VCs keep their preferred stock and receive their liquidation preferences instead of converting to common.[3] Giving VCs preferred stock can mitigate information asymmetry, improve the entrepreneur's incentive to exert effort (Sahlman, 1990), and generate tax benefits for the firm (Gilson and Schizer, 2003).

VCs typically receive extensive control rights in their portfolio companies, including protective provisions giving VCs the right to veto certain major transactions, such as the sale of key assets (Kaplan and Strömberg, 2003). More important, VCs frequently acquire control of the board. Unlike protective provisions, which give VCs the power only to block unfavorable transactions, board control enables VCs to replace managers as well as initiate fundamental transactions such as sales, IPOs, and dissolutions (Fried and Ganor, 2006). Board control thus enables VCs to monitor the entrepreneur–manager and fire her if necessary (Lerner, 1995; Gompers, 1995; Hellmann, 1998) and assists VCs in exiting their investment over the entrepreneur–manager's objection (Smith, 2005).

2.2. Hypotheses: common shareholders' holdup power around exit

When VCs seek to exit their investment, they could face opposition not only from the firm's manager (either the original entrepreneur or a hired professional), but also from other common shareholders. Common shareholders, including the manager, might resist a sale for two reasons. First, sale of the firm to an acquirer could eliminate the manager's position and private benefits (Aghion and Bolton, 1992). Second, when the VCs exit as preferred shareholders asserting their liquidation preferences, little

[3] If the firm's shares are sold in an IPO the financing agreement typically requires the VCs to convert to common stock even if the preferred stock would offer a higher payout (Hellmann, 2006).

might be left for common shareholders as a class. The common shareholders thus might prefer keeping the firm independent in the hope that it is later sold for a higher price or undergoes an IPO in which the VCs are forced to convert to common (Hellmann, 2006). To overcome common shareholder opposition to a sale, the VCs could agree to give up part of their cash flow rights when they exit.

Common shareholders' ability to hold up the VCs depends, in part, on the allocation of control rights within the firm. Incomplete contracting theory suggests the parties might deliberately allocate control rights to common shareholders to strengthen their ex post holdup power. Aghion and Bolton (1992) show that, when the entrepreneur–manager is wealth-constrained and enjoys non-financial private benefits from the enterprise, giving some control rights to the manager can improve exit decisions. The entrepreneur–manager typically holds a considerable amount of common stock (and, at least initially, may be the main or only common shareholder). Thus, allocating control rights to common shareholders as a class could serve ex post efficiency by indirectly giving some power to the firm's entrepreneur–manager.

Similarly, Hellmann (2006) shows that allocating some control to common shareholders as a group can improve the choice between private sale (in which the VCs exit with their liquidation preferences) and an IPO (where the VCs are forced to convert to common), while preserving managers' incentive to generate value.

We now describe how the contractual allocation of two types of control rights can be used to give common shareholders more power to hold up a sale, and we offer hypotheses about how the allocation of each type of right should affect common shareholders' ability to capture some of the VCs' cash flow rights.

2.2.1. Hypothesis 1: board seats

Under the corporate law of every state, a sale of the firm requires approval by a majority of the directors. The allocation of board seats is determined contractually in connection with each round of financing (Kaplan and Strömberg, 2003), with seats typically divided among VCs, common shareholder representatives, and outside directors mutually appointed by the common shareholders and the VCs.

When VCs have a board majority, they can unilaterally effect board authorization of a sale. However, VCs lacking a board majority must obtain the cooperation of at least one non-VC director to sell the firm. The price of such cooperation could involve giving up a portion of their liquidation preferences to common shareholders. Everything else equal, we predict that when VCs lack a board majority the expected deviation from VCs' cash flow rights is larger. We refer to this as the *Board Blocking Hypothesis*.

2.2.2. Hypothesis 2: shareholder rights

A second potential source of common shareholders' holdup power vis-à-vis VCs comes from their corporate law voting rights and ability to sue directors for breach of their fiduciary duty to shareholders (Fried and Ganor, 2006). These rights depend on the laws of the state in which the firm is incorporated.

Consider first common shareholders' voting rights under corporate law. Corporate law requires that shareholders approve by majority vote certain structural changes that substantially alter their investment interest, including a sale of the firm. Common shareholders' ability to use voting rights to impede a sale may depend on the strength of these voting rights, which vary from state to state.

Next consider common shareholders' ability to sue directors for breach of fiduciary duty. The directors of a VC-backed firm, like those of any other corporation, owe a fiduciary duty of loyalty to the firm and its shareholders. Depending on the state's fiduciary-duty case law, common shareholders might have stronger (or weaker) legal grounds for attacking a sale as a violation of directors' fiduciary duty. The more favorable the law is to common shareholders, the more likely directors are to structure the sale in a way that provides a payout to common shareholders.

We predict that incorporation in a jurisdiction that provides greater legal protection to common shareholders through voting rights or fiduciary duty law leads to greater deviations from VCs' cash flow rights. We refer to this as the *Shareholder Rights Hypothesis*.

3. The data

We study the effect of common shareholder power on the performance of VCs' cash flow rights using a hand-collected data set of VC-backed Silicon Valley firms. This section describes the data collection process and provides descriptive statistics of the firms in our sample.

3.1. Data gathering

We obtained from VentureReporter.net a list of VC-financed companies located in California that were sold to an acquirer in 2003 or 2004. We filtered out all firms except those located in and around San Francisco, San Jose, and Oakland (broadly defined as "Silicon Valley"), leaving a population of 193 firms.

For each firm we sought to locate and obtain data from one or more persons knowledgeable about the firm's life, from formation to sale. We identified current business addresses for the founders or executives (all of whom we call "entrepreneurs" for convenience) of 141 of the 193 companies. We mailed letters asking entrepreneurs from each firm to provide us with data, promising to keep confidential the identity of the entrepreneur and the start-up firm. We made follow-up phone calls to encourage participation approximately two weeks after the letter was sent out.

Entrepreneurs from 57 of the 141 firms agreed to provide us with data, a response rate of 40.4%. The information obtained, supplemented by publicly filed corporate charters, covered each firm's entire lifespan. Among the data gathered were the state of incorporation, the cash flow rights and control rights negotiated in each

VC financing round, the identities and backgrounds of the chief executive officer (CEO) and directors, and the terms of sale, including the amounts paid to various classes of shareholders.

From the original set of 57 firms, we removed seven for lack of adequate data, leaving 50 firms. In most of these sales (42 out of 50) the VCs exited as preferred shareholders. In the remaining eight firms the VCs converted into common stock in connection with the sale, giving up their liquidation preferences.

3.2. Selection issues

Our sample is limited to Silicon Valley firms sold in 2003 or 2004. Factors unique to the Silicon Valley VC market or to this time period could limit the generalizability of our results. Silicon Valley is a closely knit community with its own norms and ways of doing business (Suchman and Cahill, 1996), in which reputational considerations are particularly important (Black and Gilson, 1998). Our sample firms were sold several years after the tech bubble collapsed, a period when VCs lost considerable amounts of money. These losses could increase the conflict between VCs and common stockholders around exit events. The allocation of proceeds from the sale of start-ups in our sample could thus reflect not only common shareholder holdup power but also the post-bubble time period and factors unique to Silicon Valley.

In addition, our sample consists only of companies whose entrepreneurs voluntarily responded to our request for information. Systematic differences could exist between firms with entrepreneurs who responded to our inquiries and firms with entrepreneurs who did not. We sought to minimize such biases by soliciting data from every entrepreneur we could locate and offering confidentiality. However, our sample might not be completely representative of Silicon Valley firms sold in 2003 and 2004. Because of these representativeness concerns, the frequency and magnitude of deviations from VCs' cash flow rights in our sample firms could be higher or lower than they are in other periods and places.

3.3. Sample description

Our sample firms are high-tech businesses, primarily in the biotech, software, telecommunications, and internet sectors (Panel A of Table 1). The concentration of information-technology related businesses is representative of VC-financed firms generally (Kaplan and Strömberg, 2003, p. 284). At the time of sale, the firms had received an average of $42 million in VC funding and had been operating for an average of approximately five years. The mean sale price was $55 million. Panel B of Table 1 provides information on the amount invested, number of financing rounds, number of years of operation, and sale price. Data are shown separately for the full sample of 50 firms and for the 42 firms in which the VCs held preferred stock and asserted their liquidation preferences in connection with the sale (the "VC preferred sample").

3.4. VCs' cash flow rights

VCs' aggregate liquidation preferences at the time of sale are $47 million on average. In the first round of financing the liquidation preference usually equals the amount invested (a 1x preference), while the liquidation preference in subsequent rounds is more likely to be a higher multiple (i.e., 2x or 3x) of the amount invested (Panel C). At the sale, aggregate preferences are on average somewhat greater than the amount invested (Panel B).

When VCs maintain their preferred stock instead of converting to common stock, the allocation of the sale proceeds depends on the relation between the VCs' liquidation preferences and the sale price. If liquidation preferences exceed the sale price and contractual priority is fully respected, common shareholders get nothing. Liquidation preferences exceed the sale price in 31 of the 42 firms in which the VCs exited as preferred shareholders (Panel D). In eight firms, it was in the VCs' interest to convert to common stock instead of maintaining their liquidation preferences. In these sales, the allocation of sale proceeds was pro rata among all common shareholders (the original common shareholders and the converting VCs).

3.5. Common shareholder power

This sub-section describes the extent of common shareholder power (board seats and corporate law rights) in our sample firms. The data are summarized in Table 2. We then use our data to operationalize each common shareholder power hypothesis.

3.5.1. Board seats

Common shareholders may have power through their board representatives. We divide directors into three categories: VC, common shareholder, and outside director. Outside directors are typically industry experts mutually appointed by the VCs and the common shareholders. If a particular outside director was selected exclusively by the VCs (common shareholders), we designate this person as a VC (common shareholder) director. Our de facto classification of outside directors differs from the formal classification used by Kaplan and Strömberg (2003), which treats any board seat intended for a director who is neither a VC nor a representative of common shareholders as held by an outside director. The use of de facto instead of formal classification does not affect our econometric results.

Panel A reports the allocation of board seats. At the time of sale, 56.5% of all directors are appointed by the VCs and 22.8% are appointed by common stockholders. Panel B shows that the VCs control the board in 29 of the 50 (58%) firms. In our sample, common stockholders rarely control the board at the time of the sale (three of 50 firms). However, in 21 firms the combination of outside directors and common stockholders can block a sale. The

Table 1
Descriptive statistics and liquidation preferences.

This table provides descriptive statistics for a sample of 50 VC-backed firms sold in 2003 or 2004. Panel A shows industry distribution. The industry classification is provided by www.linksv.com. Panel B reports the mean and median period of operation, number of financing rounds, amount invested, and sale price for the firms in our sample. Panel B also shows the aggregate liquidation preferences (LP) held by the VC investors at the time of sale, in dollar amount and as a ratio of the amount invested and the sale price. Panel C shows the preferences issued in each round of financing. The first column lists the number of financing rounds that used 1x preferences. The second and third columns list financing rounds where preferences between 1x up to 2x and greater than 2x were used, respectively. The final column lists financing rounds in which the liquidation preferences of earlier investors were waived or reduced (a "recap" financing). Panel D shows, at the time of sale, the number of companies in which the LP were greater or less than the sale price. Data are shown separately for the full sample of 50 firms and for the 42 firms in which the VCs exited as preferred shareholders (VC preferred sample).

Panel A. Industry distribution of companies

Sample	Biotech	Telecom	Software	Internet	Other
Full sample (=50)	6	13	12	10	9
VC preferred sample (=42)	5	11	11	8	7

Panel B. Financing overview

	Full sample (=50)			VC preferred sample (=42)		
Variable	Mean	Median	Standard deviation	Mean	Median	Standard deviation
Years of operation	5.1	5	1.6	5.3	5	1.6
Number of financing rounds	3.0	3	1.1	3.1	3	1.1
Amount invested (millions $)	42.2	31	36.7	46.3	35.1	38.4
Sale price (millions $)	55.0	24.3	103.9	47.6	19	108.9
Aggregate LP (millions $)	46.9	33.5	38.9	50.2	38.7	40.2
LP divided by amount invested	1.24	1	0.63	1.19	1	0.58
LP divided by sale price	8.5	1.5	25.0	10.0	1.8	27.1

Panel C. Liquidation preferences

Round Number	1x	≤2x	>2x	Recap
First round (=50)	46	2	2	0
Second round (=39)	25	10	3	1
Third round (=24)	15	2	2	5
Fourth round (=10)	2	2	2	4
Fifth round (=5)	1	1	0	3

Panel D. Relation of liquidation preferences to sale price

Sample	LP > sale price	LP < sale price
Full sample (=50)	31	19
VC preferred sample (=42)	31	11

Board Blocking Hypothesis predicts that deviations from VCs' cash flow rights are more likely when, as in these 21 firms, VCs lack board control.

3.5.2. Shareholder rights

All our companies were incorporated in either California or Delaware at time of sale, consistent with findings that most public firms incorporate either in their home state or Delaware (Daines, 2002; Bebchuk and Cohen, 2003). Panel C of Table 2 shows that 35 out of 50 firms were incorporated in Delaware at the time of the sale. As we explain below, California law gives common shareholders somewhat more power in relation to preferred shareholders through both voting rights and the threat of fiduciary-duty litigation.

Turning first to common shareholders' corporate law voting rights, California and Delaware provide different voting rights for shareholders (Fried and Ganor, 2006). In Delaware, sales need be approved only by holders of a majority of all the firm's outstanding stock, both preferred and common. Consistent with Kaplan and Strömberg (2003), we find that VCs almost always have sufficient voting power to dictate the outcome of a stockholder-wide vote. In contrast, California requires a separate vote for each class of shareholders, including common. Thus, when the VCs remain preferred shareholders, common shareholders of California-domiciled firms can more easily impede a sale they oppose.

However, the difference in voting rights between California and Delaware might not be as significant as it appears. First, VCs have various techniques for neutralizing common shareholders' voting power, such as using corporate funds to acquire a large block of common stock that can be voted in favor of a sale (Fried and Ganor, 2006).[4] Thus, separate class voting might not give

[4] VCs can also negotiate for drag-along rights, a contractual provision under which common shareholders agree to vote for transac-

Table 2
Control rights.

This table reports the distribution of corporate governance rights in a sample of 50 VC-backed firms sold in 2003 or 2004. Panel A reports the mean and median board representation for common shareholders, VCs, and outside directors. Panel B shows board control at the time of sale. If the VCs (or common shareholders) control more than half the board seats, we classify this as "Control". If the board has an even number of seats and the VCs (or common shareholders) appoint exactly half the directors, we treat this as "Blocking". "Shared control" means that the VCs and the common shareholders each appoint fewer than half the directors, with outside directors constituting the tie breaking vote. Panel C shows the state of incorporation at the time of sale.

Panel A. Board seats at time of sale

	Full sample (=50)			VC preferred sample (=42)		
	Mean	Median	Standard deviation	Mean	Median	Standard deviation
Total number of board seats	5.74	5	1.52	5.76	5	1.54
Common seats (percent of board)	22.8	20.0	0.137	20.4	20.0	0.098
VC seats (percent of board)	56.5	57.1	0.172	58.6	57.1	0.174
Outsider seats (percent of board)	20.7	20.0	0.185	21.0	20.0	0.188

Panel B. Distribution of board control

Sample	Common control	Common blocking	Shared control	VC blocking	VC control
Full sample (=50)	3	0	12	6	29

Panel C. State of incorporation at time of sale

Sample	Delaware	California	Other
Full sample (=50)	35	15	0

common shareholders of California-domiciled firms that much more holdup power.

Second, and more important, California purports to subject quasi-California corporations (corporations doing business in California but incorporated elsewhere) to the requirement of a separate class vote.[5] While California's legal ability to impose this requirement on firms incorporated elsewhere is contested, many (but not all) Delaware-incorporated companies located in California are advised by lawyers to hold a separate class vote. In our sample, all but one Delaware-incorporated firm held a separate class vote for the common.

Thus, as a practical matter, California (as opposed to Delaware) incorporation may not give common shareholders much more power through voting rights. Nevertheless, common shareholders' ability to impede a transaction is still likely to be somewhat greater in a California-incorporated firm, where a separate class vote is indisputably mandatory.

Turning next to common shareholders' ability to threaten directors with fiduciary duty litigation, California's substantive law makes it easier for common shareholders to prevail in a lawsuit against a board controlled by VCs than Delaware's (Fried and Ganor, 2006). Delaware law permits a VC-controlled board to make decisions that favor preferred shareholders at the expense of the common, as long as the decisions can plausibly be defended as being in the best interests of the corporation. In contrast, California law generally affords stronger protection to minority shareholders, including common shareholders in firms with VC-controlled boards. Thus, directors of California-domiciled firms might believe they face greater risk of liability for harming common shareholders.

Because both common shareholders' voting rights and fiduciary-duty rights are somewhat stronger in California than in Delaware, we operationalize the *Shareholder Rights Hypothesis* based on whether the firm was incorporated in California rather than in Delaware at the time of sale.

4. Deviations from VCs' cash flow rights: evidence

In this section we describe deviations from VCs' cash flow rights in our sample. We compare the actual payout received by VCs to their contractual entitlement. If the VCs convert to common shares, their contractual entitlement equals their pro rata share of the sale price. If the VCs exit as preferred shareholders, their contractual entitlement is the lesser of their liquidation preferences and the sale price. In those cases in which the sale price exceeds the liquidation preferences and the VCs exit holding participating preferred stock, we define VCs' cash flow rights as the sum of their liquidation preferences and their participation rights. For each firm, we calculate the fraction of the VCs' cash flow rights actually paid to the VCs (the *Realization Rate*). To illustrate, if the VCs are entitled to $20 million at a given sale price but receive only $18 million, the *Realization Rate* is 0.9 (i.e., 18/20). Our null hypothesis is that *Realization Rate* equals one for each firm (i.e., cash flow rights are fully respected).

(*footnote continued*)
tions backed by the VCs under certain conditions. Drag-along rights were not widely used during the period when most of our sample firms were financed but have become more common in recent years.

[5] See Cal. Corp Code 2115(b) (West 1990).

Table 3
Deviation from VCs' cash flow rights.

This table describes deviations from VCs' cash flow rights in a sample of 50 VC-backed firms sold in 2003 or 2004. The first two rows provide summary statistics on the carveout payment (in millions of dollars) and VCs' realization rate for the full sample (=50). The last two rows provide the same data, limited to companies in which a deviation occurred (Deviation sub-sample (=11)). The included summary statistics are mean, dollar-weighted mean (DW mean), median, standard deviation, minimum, and maximum. DW mean is weighted by the firm's sale price and applies only to realization rate.

Full sample (=50)	Mean	DW mean	Median	Standard deviation	Minimum	Maximum
Carveout to common	0.81	–	0	2.20	0	10
Realization rate	0.977	0.981	1	0.059	0.733	1
Deviation sub-sample (=11)						
Carveout to common	3.70	–	2.5	3.44	0.03	10
Realization rate	0.893	0.896	0.9	0.087	0.733	0.99

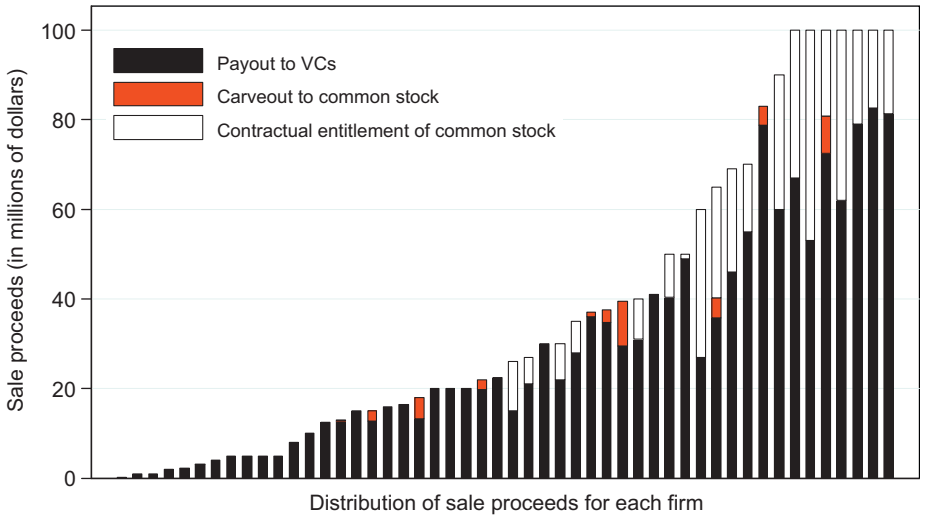


Fig. 1. This figure shows the distribution of sale proceeds between VCs and common stockholders in a sample of 50 VC-backed firms sold in 2003 or 2004. Each bar represents a firm's total sale price (in millions of dollars). The sale price is divided into three components: (1) the amount paid to VCs (in black), (2) the carveout payment given to the original common stockholders (in red or grey), and (3) the contractual entitlement of the original common stockholders at the given sale price (in white). Thus, the VCs' contractual entitlement is represented by the sum of (1) and (2). The payout received by the VCs is represented by (1). The payout received by the original common shareholders is represented by the sum of (2) and (3). Although deviations from VCs' cash flow rights (i.e. carveouts) occurred in 11 firms, only nine are visible in the graph above. The remaining two carveouts are too small to be seen. For ease of presentation, all firms sold for more than $100 million are normalized to a purchase price of $100 million.

Table 3 describes the deviations from cash flow rights in our sample.[6] Deviations occur in only 11 sales (22% of the 50 firm sample) and tend to be relatively small. In this subset of 11 firms, the average deviation in favor of common stock is $3.7 million and the average *Realization Rate* for VCs is 89%. The lowest *Realization Rate* is 73% and the largest absolute deviation is $10 million. Among all 50 companies, VCs' average *Realization Rate* is 97.7% (or 98.1% on a dollar-weighted basis), and common stockholders receive, on average, only $810,000 more than their contractual entitlement. Consistent with Hellmann (2006), all the deviations occurred in firms in which the VCs exit holding preferred stock. These figures suggest that, overall, VCs' cash flow rights are robust, even when VCs exit asserting their liquidation preferences.

In theory, *Realization Rate* could exceed one. If common shareholders favor a sale opposed by the VCs, they might give up a portion of their cash flow rights to preferred-owning VCs to induce the reluctant VCs to support the sale. Had such renegotiation occurred in our sample, we could have observed it. However, among our firms, *Realization Rate* never exceeds one.

Fig. 1 illustrates the distribution of sale proceeds between common stockholders and VCs. Each bar's height represents a firm's sale price. The sale price is divided into three components: (1) the amount paid to VCs (in black), (2) any carveout from VCs' cash flow rights

[6] Table 3 reports only renegotiations of VCs' cash flow rights that occurred in connection with the sale of the firm. Our data also suggest, however, that VCs' cash flow rights are sometimes altered in connection with a round of financing. For example, in 13 rounds of financing VC investors gave up a portion of their liquidation preferences from earlier financing rounds (Table 1, Panel C, recap financings). Contractual priority rights might be reduced as part of a voluntary recapitalization of the firm, perhaps to eliminate debt overhang (Myers, 1977). Alternatively, pay-to-play provisions may force a VC to convert to common stock (and thereby give up its preferences) if it fails to participate in a subsequent financing round.

extracted by common stockholders (in red or grey), and (3) common shareholders' contractual entitlement, assuming VCs' cash flow rights were fully respected (in white). The VCs' cash flow rights are the sum of (1) and (2). The payment to common shareholders is the sum of (2) and (3).

5. Explaining deviations: common shareholder power

VCs might give up part of their cash flow rights for reasons other than common shareholder's ability to holdup a sale. For example, VCs may wish to establish a reputation for being fair to common shareholders. Thus, we cannot infer from the existence of deviations from VCs' cash flow rights that they are caused by common shareholders' holdup power. In this section, we test whether common shareholder holdup power can explain the observed deviations from VCs' cash flow rights. We estimate, using ordinary least squares (OLS) and Tobit regression, the following equation for deviation from VCs' cash flow rights:

$$\textit{Realization Rate} = F(\textit{holdup power}, \textit{controls}) \quad (1)$$

Because *Realization Rate* never exceeds one, a concern could arise that our dependent variable is censored. If *Realization Rate* were technically or observationally censored at one, Tobit would be an appropriate estimation technique (Wooldridge, 2002). However, neither type of censoring seems to be present in our setting. *Realization Rate* could take on values greater than one, and nothing would prevent us from observing such occurrences. Given this structure, we first estimate Eq. (1) using OLS. However, to account for the possibility that our data are technically censored, in Section 5.2 we reestimate Eq. (1) using Tobit regression.

5.1. Empirical results

We use separate variables to test each hypothesis about common shareholder power. *Board Blocking* is a dummy variable equal to one if VCs lack board control at the time of sale and equal to zero otherwise. For shareholder rights, we use a dummy variable, *California*, coded to one if the firm is incorporated in California at the time of sale and zero if it is incorporated in Delaware. Our hypotheses predict that *Board Blocking* and *California* each has a negative effect on VCs' *Realization Rate*. Collectively, we refer to *Board Blocking* and *California* as the "power variables".

We also include numerous control variables to separate the effect of common shareholders' holdup power from other factors that might affect deviations from VCs' cash flow rights. We describe particular control variables throughout the remainder of this section. Table 4 defines all the variables used in our models and provides summary statistics for each. Table 5 presents a correlation matrix for the included variables.

Table 6 reports our multivariate regression results. We control for various features of the sold company and the acquirer. To account for stage of development, we measure the number of *Rounds of Financing*. To proxy for firm size and the amount VCs have at stake, we use total amount invested (*Total Invested*). We use a dummy variable, *Serial Entrepreneur*, to indicate if any of the firm's founders had previously started another firm. We use a dummy variable, *Founder CEO*, to indicate if the CEO at sale was one of the original founders. *Management Bonus* (%) records any nonretention bonuses paid to management in connection with the sale, as a percentage of sale price.[7] To control for acquirer

Table 4
Variable definitions and summary statistics.

This table defines the variables used in Tables 5–7 and provides descriptive statistics for each. Realization Rate equals the amount paid to the VCs in connection with the sale divided by the VCs' cash flow rights; Carveout (Y/N) is a binary dependent variable that equals one if the original common shareholders received a carveout payment and zero otherwise; Carveout ($) measures the amount received by common shareholders in excess of their cash flow rights in millions of dollars; Board Blocking equals zero if the VCs control more than half the board seats at the time of sale and one otherwise; California equals one if the company was incorporated in California at the time of sale; Founder CEO is a dummy equal to one if a founder was the chief executive officer (CEO) at the time of sale and zero if a professional CEO had been appointed; Rounds of Financing measures the number of rounds of VC financing; Total Invested equals the total amount invested in the company prior to sale (in millions of dollars); Serial Entrepreneur is a dummy variable set to one if one of the company's founders had previously founded another company and zero otherwise; Management Bonus (%) records the sum of any non-retention bonuses awarded to the startup's employees in connection with the sale as a percent of the sale price; Public Acquirer equals one if the acquirer was publicly traded at the time of sale and zero otherwise; VC Age is a proxy for VC reputation and is set equal to the year the startup was acquired minus the average of the yeras in which the company's lead VC investors were founded; Profit is a dummy equal to one if the VCs' contractual entitlement at sale was greater than the amount invested in the company, and zero otherwise; Washout equals one if the common shareholders' contractual entitlement is $0, and zero otherwise; Log |Price−LP| equals the natural log of the absolute value of the difference between the sale price and the aggregate liquidation preferences at the time of sale (in millions); and VC Conversion is a dummy variable set to one if the VCs convert their preferred shares to common shares in connection with the sale of the firm.

Variable	Mean	Median	Standard deviation
Realization Rate	0.98	1	0.06
Carveout (Y/N)	0.22	0	0.42
Carveout ($)	0.81	0	2.20
Board Blocking	0.42	0	0.50
California	0.30	0	0.46
Founder CEO	0.38	0	0.49
Rounds of Financing	3.00	3	1.12
Total Invested	42.18	31	36.67
Serial Entrepreneur	0.46	0	0.50
Management Bonus (%)	0.02	0	0.04
Public Acquirer	0.72	1	0.45
VC Age	15.91	14.5	10.01
Profit	0.40	0	0.49
Washout	0.62	1	0.49
Log |Price−LP|	3.07	2.94	1.26
VC Conversion	0.16	0	0.37

[7] In 16 of the 42 firms in our sample, non-retention bonuses (payments not contingent on continued employment with the acquirer) were given to management (including but not necessarily limited to the

Table 5
Pairwise correlation matrix.

The table shows pairwise correlations among the variables in a sample of 50 VC-backed firms sold in 2003 or 2004. Correlations significant at the 5% level or better are highlighted in bold. Definitions and summary statistics for each variable are provided in Table 4.

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Board Blocking	–															
2	California	**−0.29**	–														
3	Founder CEO	**0.34**	**−0.42**	–													
4	Rounds of Financing	**−0.29**	0.20	**−0.41**	–												
5	Total Invested	0.00	0.12	−0.17	**0.45**	–											
6	Serial Entrepreneur	0.19	−0.25	0.10	−0.07	−0.07	–										
7	Management Bonus (%)	−0.13	−0.06	−0.01	0.13	0.10	−0.01	–									
8	Public Acquirer	0.26	−0.18	0.21	−0.08	0.16	−0.05	0.18	–								
9	VC Age	0.22	−0.02	**−0.29**	0.07	−0.03	0.16	0.02	−0.11	–							
10	Profit	**0.38**	−0.18	**0.37**	**−0.48**	−0.15	0.07	**−0.39**	**0.33**	−0.12	–						
11	Washout	**−0.34**	0.06	−0.24	**0.37**	0.08	−0.02	**0.37**	**−0.30**	0.17	**−0.87**	–					
12	Log |Price – LP|	0.05	−0.10	0.06	−0.14	0.14	0.02	−0.22	0.19	−0.04	**0.31**	−0.26	–				
13	VC Conversion	**0.29**	**−0.29**	**0.33**	**−0.29**	−0.26	−0.07	−0.24	0.27	−0.24	**0.53**	**−0.56**	0.26	–			
14	Realization Rate	−0.26	0.03	**−0.32**	0.04	0.12	−0.16	−0.27	−0.24	0.05	−0.07	−0.16	0.21	0.17	–		
15	Carveout (Y/N)	0.14	0.07	0.18	0.09	−0.07	−0.10	0.23	0.22	−0.10	−0.04	0.22	**−0.29**	−0.23	**−0.75**	**–**	
16	Carveout ($)	0.27	0.08	**0.34**	−0.01	−0.02	0.14	0.07	0.23	−0.11	0.20	0.02	−0.17	−0.16	**−0.81**	**0.71**	–

financial structure, we use a dummy variable, *Public Acquirer*, set to one if the acquirer was publicly traded at the time of sale. Following Gompers (1996), we account for VC reputation by measuring the average age of the VC firms leading each round of financing (*VC Age*).[8] Model 1 estimates the effect of our two power variables (*Board Blocking* and *California*) on *Realization Rate*, with the above control variables as covariates.

The ability and incentive of common stockholders to renegotiate VCs' cash flow rights could depend on the relation between the sale price and VCs' investment, and on the relation between the sale price and VCs' cash flow rights. In Model 2, we add three variables to control for these possibilities. First, we control for whether the VCs are entitled to receive the entire sale price (a washout). In a washout, common stockholders would get nothing and thus have little to lose by blocking the sale. To capture this effect, we code *Washout* equal to one when the VCs have a right to receive the entire sale price and zero otherwise. Second, VCs' bargaining incentives might depend on whether VCs would make a profit if their cash flow rights were fully respected. If VCs are loss-averse, they may be less willing to offer a carveout when they lose money on their investment. To control for this possibility, we code *Profit* as one if the VCs would make a profit and zero otherwise.

Third, we control for the unrealized option value of common stock. The higher the option value, the more common shareholders have to lose in the sale and the harder they might negotiate for a carveout. Option value is likely to decline with the distance between the sale price and the VCs' liquidation preferences. If the sale price is significantly below (instead of just below) the VCs' liquidation preferences, a future sale is less likely to be at a price that exceeds those preferences. Similarly, if the sale price is significantly above (instead of just above) the liquidation preferences, the likelihood that a future offer will provide more value to common shareholders is also lower. To control for unrealized option value, we calculate the natural log of the absolute value of the difference between the sale price and the VCs' liquidation preferences at the time of sale (*Log|Price − LP|*).

In Model 2, we also use a dummy variable (*VC Conversion*) to control for whether the VCs convert to common stock in connection with the sale, thereby giving up their liquidation preferences. Because VCs convert only if the common shares are relatively valuable, common shareholder opposition and renegotiation of VCs' cash flow rights are less likely when VCs convert to common stock.

In Model 3, we add dummy variables for the law firm representing the firm at the time of sale. The law firm can influence the choice of corporate law and other governance arrangements. The law firm can also affect how the sale is structured and might discourage (or encourage) the

(*footnote continued*)
CEO) upon closing the sale. Because such payments benefit individuals who often hold (and can vote) large amounts of common stock, they could be considered, at least in part, disguised non-pro-rata payment to common shareholders, instead of payments to employees. However, to be conservative in our measurement of deviation from VCs' cash flow rights we assume that management bonuses are not payments to managers as common shareholders, but rather payments to managers as employees.

If these management bonuses are disguised payments to common stockholders, they should be treated as (a) part of the value available to common and preferred shareholders upon sale and (b) paid to common shareholders. To determine whether this treatment affects our cross-sectional results, we ran regressions on a modified realization rate that treated non-retention management bonuses as part of the sale price and therefore available to shareholders as a group, but paid only to common shareholders. In these (unreported) regressions the coefficient estimates for our power variables are similar to (though less significant than) the results reported in Table 6.

[8] We also code for VC reputation based on dollars under management and VC location (Lerner, 1995). These alternative measures are highly correlated with *VC Age*. The use of *VC Age* instead of these other measures does not affect our findings.

Table 6
Multivariate regression.

This table reports ordinary least squares (OLS) regressions on a sample of 50 VC-backed firms sold in 2003 or 2004. The dependent variable in Models 1–4 is Realization Rate, which measures the fraction of the VCs' cash flow rights that was actually paid to the VCs. The dependent variable in Model 5 is Carveout ($), measuring deviations from VCs' cash flow rights in millions of dollars. Model 6 uses a linear probability model (OLS) to estimate a binary dependent variable, Carveout (Y/N), which equals one if a carveout payment was awarded to the original common shareholders and zero otherwise. All explanatory variables are defined in Table 4. Heteroskedastic-robust (White, 1980) standard errors are reported in parentheses below each coefficient estimate. We use a 2-sided test for statistical significance (*=10% significance; **=5% significance; ***=1% significance).

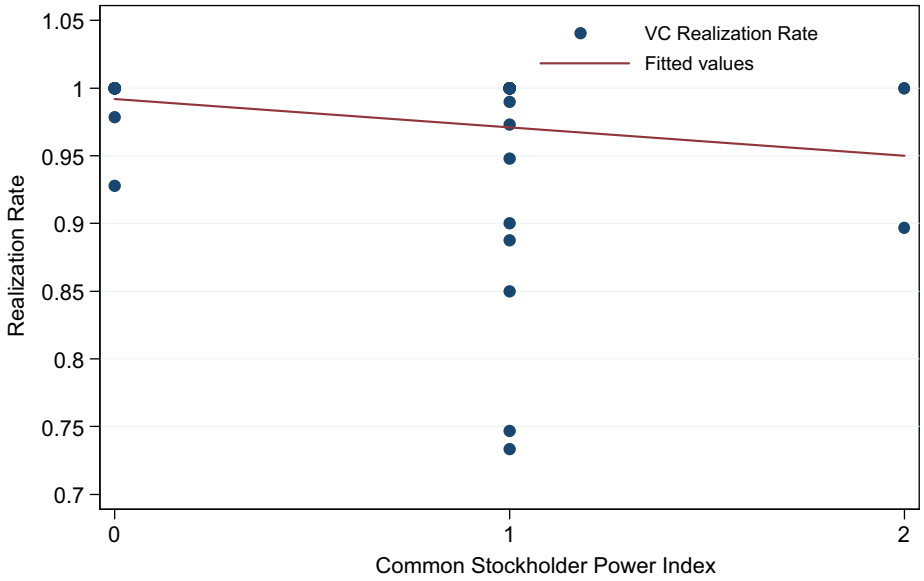
Variable	OLS					
	Realization Rate				Carveout ($)	Carveout (Y/N)
	(1)	(2)	(3)	(4)	(5)	(6)
Power Variable						
Board Blocking	−0.031*	−0.042**	−0.046**	−0.040***	1.506**	0.269*
	(0.018)	(0.018)	(0.020)	(0.014)	(0.602)	(0.137)
California	−0.034**	−0.031*	−0.032**	−0.020	1.599*	0.168
	(0.016)	(0.016)	(0.015)	(0.014)	(0.800)	(0.143)
Control Variable						
Rounds of Financing	−0.011	−0.013**	−0.014**	−0.013**	0.566**	0.106
	(0.006)	(0.006)	(0.006)	(0.005)	(0.248)	(0.066)
Total Invested	0.0004**	0.0004**	0.0004**	0.0006**	−0.010	−0.003**
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.006)	(0.001)
Serial Entrepreneur	−0.019	−0.014	−0.018	−0.011	0.508	−0.110
	(0.017)	(0.015)	(0.014)	(0.012)	(0.553)	(0.111)
Founder CEO	−0.041**	−0.027**	−0.026*	−0.016	1.274*	0.117
	(0.018)	(0.012)	(0.014)	(0.013)	(0.630)	(0.135)
Management Bonus (%)	−0.451	−0.352	−0.459	−0.389	3.003	1.149
	(0.368)	(0.378)	(0.363)	(0.339)	(4.745)	(1.757)
Public Acquirer	−0.020	−0.028*	−0.013	−0.032**	1.009**	0.253*
	(0.015)	(0.016)	(0.017)	(0.014)	(0.398)	(0.130)
VC Age	0.0003	0.0012*	0.0014*	0.0017**	−0.050**	−0.010
	(0.0008)	(0.0006)	(0.0007)	(0.0007)	(0.024)	(0.007)
Profit		−0.110**	−0.107**	−0.116***	4.311**	0.649***
		(0.040)	(0.046)	(0.029)	(1.958)	(0.151)
Washout		−0.105**	−0.099**	−0.116***	3.514**	0.653***
		(0.039)	(0.045)	(0.027)	(1.866)	(0.154)
Log |Price − LP|		0.006	0.008*	0.009**	−0.259	−0.067
		(0.004)	(0.005)	(0.004)	(0.197)	(0.041)
VC Conversion		0.047**	0.051**	0.051***	−2.080**	−0.394**
		(0.021)	(0.021)	(0.018)	(0.949)	(0.174)
Law firm dummies	N	N	Y	N	N	N
Industry dummies	N	N	N	Y	N	N
Constant	1.061	1.133	1.117	1.078	−5.075	−0.574
	(0.033)	(0.048)	(0.056)	(0.036)	(2.211)	(0.281)
R^2	0.33	0.60	0.66	0.70	0.60	0.52
Number of Observations	50	50	50	50	50	50

payment of a carveout to common shareholders. We use a separate dummy variable for each law firm that represented at least five firms. In our sample, three law firms met this criterion Wilson Sonsini Goodrich & Rosati (representing ten firms), Cooley Godward (representing eight firms), and Venture Law Group (representing eight firms).

In Model 4, we add industry dummy variables. We use the industry classification provided by www.linksv.com for each firm. We include industry dummy variables for *Biotech*, *Telecom*, *Software*, and *Other IT. Internet* is the excluded category.

The results displayed in Table 6, Models 1–4, provide preliminary support for our two holdup power hypotheses. *Board Blocking* and *California* are each negatively correlated with *Realization Rate* in all models, and each is statistically significant at the 10% level or better in most models. Our results are robust to various controls and to law firm and industry effects. We find that that the extent of common shareholders' holdup power predicts renegotiation of VCs' cash flow rights.

To illustrate the relation between common shareholder power and deviations from VCs' cash flow rights, we construct an index for common stockholder power. The index is created by summing *Board Blocking* and *California* for each firm. The resulting Common Stockholder Power Index ranges from zero to two, with higher scores representing greater holdup power for common stockholders. The downward sloping curve in Fig. 2 indicates that VC *Realization Rate* is lower when common shareholders have more holdup power. Immediately below the diagram in Fig. 2 is a table summarizing the frequency and magnitude of deviations conditional on the index of common stockholder power. The graph and table



Deviations conditional on common stock power index

Common stock power index	Number of observations	Number (percent) of carveouts	Average Realization Rate	Average dollar value of carveouts (in millions of dollars)
0	17	2 (0.12)	0.995	0.162
1	30	8 (0.27)	0.968	0.933
2	3	1 (0.33)	0.966	3.333
All	50	11 (0.22)	0.977	0.814

Fig. 2. Using a sample of 50 VC-backed firms sold in 2003 or 2004, this figure shows the Realization Rate for each firm in relationship to an index of common stockholder power. The index is created by summing the shareholder power variables for each firm: California and Board Blocking. The resulting Common Stockholder Power Index ranges from 0 to 2, with higher scores representing greater holdup power. The fitted line illustrates that increasing common stock's holdup power predicts a lower Realization Rate. Because 39 firms have a Realization Rate of 1, this diagram plots several points directly on top of each other. Of the 39 firms with a Realization Rate of 1, there are 15 with a common stockholder power index of 0, 22 with a common stockholder power index of 1, and two with a common stock power index of 2. The table immediately below the diagram shows for each common stockholder power index score, the number of carveouts awarded, the average realization rate, and the average carveout to common (in millions of dollars).

make clear that additional sources of holdup power are associated with larger and more frequent deviations from VCs' cash flow rights.

We consider the economic significance of common shareholder power in firms in which the VCs exit holding preferred stock. We reestimate Model 2 using the dollar value of carveout payments awarded to common stockholders, *Carveout* ($), as our dependent variable. Results are reported in Model 5. In our sample, common stockholders can expect to receive an extra $1.5 million when the VCs lack board control and an extra $1.6 million when the firm is incorporated in California, which gives common shareholders more leverage against VCs than Delaware corporate law.

Common shareholder power should affect the frequency as well as the expected magnitude of deviation from VCs' cash flow rights when firms are sold. To test this hypothesis, we generate a new binary dependent variable, *Carveout* (*Y/N*), that equals one if a carveout is paid to common stockholders and zero otherwise. Because a maximum likelihood estimator (i.e., probit) could generate biased estimates in a sample of 50 firms, we use a linear probability model. Our results are shown in Model 6. As our hypotheses would predict, each measure of shareholder power increases the likelihood of deviation. However, while *Board Blocking* remains statistically significant, *California* does not.

Incentives in the eight firms in which the VCs convert to common stock could be different than in the other 42 firms in which VCs exit holding preferred stock with liquidation preferences. To focus exclusively on those sales in which contractual priority is implicated, we reestimate *Realization Rate* limited to the 42 firms in the VC preferred sample. Results are reported in Table 7, under Models 7 and 8. Similar to the models described above, both power variables (*Board Control* and *California*) have a negative and significant effect on *Realization Rate*.

5.2. Robustness checks

In this sub-section, we estimate a censored regression model, test for outliers, and address the possibility of spurious causation.

Because *Realization Rate* is clustered at one for a large portion of our sample, we are concerned that our dependent variable could be technically censored. To

Table 7
Robustness checks.

This table reports ordinary least squares (OLS) and Tobit regressions on a sample of 50 VC-backed firms sold in 2003 or 2004. The dependent variable in each regression is Realization Rate, which measures the fraction of the VCs' cash flow rights that was paid to the VCs. Models 7 and 8 are limited to the 42 firms in which the VCs held preferred stock at the time of the sale. Models 9 and 10 estimate Realization Rate using Tobit regression, right censored at one. All other explanatory variables are defined in Table 4. Heteroskedastic-robust (White, 1980) standard errors are reported in parentheses below each coefficient estimate. We use a two-sided test for statistical significance (*=10% significance; **=5% significance; ***=1% significance).

Variable	OLS		Tobit	
	(7)	(8)	(9)	(10)
Power Variable				
Board Blocking	−0.055**	−0.055**	−0.110*	−0.128**
	(0.022)	(0.020)	(0.065)	(0.051)
California	−0.028*	−0.035**	−0.133*	−0.102**
	(0.016)	(0.017)	(0.072)	(0.049)
Control Variable				
Rounds of Financing	−0.011	−0.012**	−0.065*	−0.069**
	(0.007)	(0.006)	(0.035)	(0.029)
Total Invested	0.0006***	0.0005***	0.002	0.003*
	(0.0002)	(0.0002)	(0.002)	(0.001)
Serial Entrepreneur	−0.008	−0.010	0.002	−0.027
	(0.017)	(0.017)	(0.054)	(0.039)
Founder CEO	−0.050**	−0.035**	−0.121	−0.033
	(0.020)	(0.014)	(0.072)	(0.059)
Management Bonus (%)	−0.318	−0.330	−1.313**	−0.878*
	(0.327)	(0.340)	(0.612)	(0.488)
Public Acquirer	−0.029	−0.028	−0.130	−0.159**
	(0.018)	(0.018)	(0.091)	(0.077)
VC Age	0.0013*	0.0016**	0.001	0.005**
	(0.0007)	(0.0007)	(0.003)	(0.002)
Profit		−0.102**		−0.194**
		(0.041)		(0.088)
Washout		−0.103**		−0.263***
		(0.039)		(0.068)
Log |Price − LP|		0.008*		0.036*
		(0.004)		(0.021)
Law firm dummies	N	N	N	N
Industry dummies	N	N	N	N
Constant	1.032	1.116	1.473	1.509
	(0.030)	(0.048)	(0.172)	(0.162)
R^2	0.48	0.65	–	–
Log likelihood	–	–	−3.36	6.38
Number of observations	42	42	50	50

address this possibility we reestimate our model using Tobit regression. Models 9 and 10 report Tobit coefficients, with *Realization Rate* right censored at one. Similar to the OLS results reported above, *Board Blocking* and *California* each has a negative and significant effect on *Realization Rate* in both Tobit models.

To determine whether our results are driven by outliers, we estimate DFbeta coefficients for our treatment variables. This technique measures the effect of each observation on an estimated coefficient by determining how much that coefficient changes when the given observation is dropped from the sample. An observation that generates a DFbeta value exceeding one in absolute value is considered problematic (Bollen and Jackman, 1990). In our sample, only one observation generated a DFbeta above this critical value. In Model 2, one observation generated a DFbeta value for *Board Blocking* of −1.56. If this observation is dropped, however, the coefficient for *Board Blocking* in Model 2 is still negative (−0.023 instead of −0.042 for the full 50-firm sample), and significant at the 10% level, suggesting that our results are not driven by outliers.

We consider the possibility of simultaneity or reverse causation problems: that deviations could cause, or be contemporaneous with, changes in our treatment variables. In fact, no significant corporate governance changes occur in the immediate vicinity of a sale in our sample. While four firms reincorporated from California to Delaware, each reincorporation occurred at least two years before the sale. Control of the board did not change in the three months immediately prior to any sale.[9]

[9] Although VCs would benefit from reducing common shareholders' holdup power right before the sale, this would be difficult for them to do, especially on short notice. For example, the VCs cannot unilaterally increase their board seats, whose allocation is contractually determined. And reincorporation out of California into Delaware can be blocked or delayed, even by a minority of the common shareholders, the group that would be hurt the most from a reincorporation. Under the California Corporations Code, state approval is required for such reincorporation. See Cal. Corp Code 25120-42. When no shareholders object, such approval is typically quickly granted. But if a single shareholder objects, the state may investigate the "fairness" of the reincorporation, delaying the transaction.

Finally, we consider whether our results are driven by omitted variables that correlate both with observed common shareholder power measures and with deviations from VCs' cash flow rights. Resolving causation in corporate governance settings is difficult, as almost all the relevant variables are endogenous (Hermalin and Weisbach, 2003). We reduce, but cannot eliminate entirely, the risk of unobserved heterogeneity by controlling for a broad range of factors and by limiting our sample to VC-backed companies that were located in one area (Silicon Valley) and sold during a narrow period of time. Ideally, one would address the omitted variable problem by instrumenting for each treatment variable or otherwise estimating a system of reduced form equations. In our case, however, a good instrument is simply not available.

Instead, we estimate the sensitivity of our findings to omitted variables using a new technique developed by Altonji, Elder, and Taber (2005) for evaluating causation in nonexperimental settings such as ours. Altonji, Elder, and Taber (2005) suggest that the correlation between a treatment variable and the other observed covariates is informative about the likely extent of correlation between the treatment variable and unobserved variables excluded from the model. Given certain assumptions, one can calculate an upper bound on the extent of omitted variable bias. The details of this technique and its application to our study can be found in Appendix A. The analysis suggests that the observed correlation between common shareholder power and deviation from VCs' cash flow rights is not spurious. While it cannot prove that our coefficient estimates are unbiased, it implies that any omitted variable bias is unlikely to be large enough to change the coefficient signs on either treatment variable. These robustness checks, together with our theory and econometric results, support our hypothesis that common shareholder holdup power causes renegotiation of VCs' cash flow rights.

Discussions with Silicon Valley venture capitalists, lawyers, and the entrepreneurs supplying us with data provide additional confirmation that we have correctly identified the causal process: that common shareholder power affects the likelihood and extent of the deviation from VCs' cash flow rights. In one California-domiciled firm, for example, the VCs carving out a portion of their liquidation preferences for common shareholders required each common stockholder to sign a liability waiver before receiving a portion of the carveout. According to the entrepreneur, the carveout was offered only because the VCs were concerned about a possible common shareholder suit challenging the terms of the sale. In another case, in which the VCs lacked board control, the entrepreneur told us that the VCs were forced to give a carveout payment to common shareholders to obtain the support of other directors for the sale. These accounts give us additional confidence that deviations from VCs' cash flow rights are driven, at least in part, by common shareholder power.

6. Conclusion

Using a hand-collected data set of Silicon Valley VC-backed firms, we investigate whether common stockholders use their holdup power to extract part of VCs' cash flow rights in connection with private sales, the most common form of VC exit. We find that VCs' cash flow rights are sometimes renegotiated. However, when such renegotiation occurs, the deviation from VCs' cash flow rights is relatively small. Across all the firms in our sample, the average dollar-weighted deviation is 1.9%. We find that such deviations are more likely to occur when VCs exit as preferred shareholders rather than convert to common stock. We also show that the likelihood and magnitude of deviations from VCs' cash flow rights are are larger when VCs have less power relative to common shareholders. In particular, common-favoring deviations are more likely to occur and are larger when VCs lack board control and when state corporate law gives common shareholders more leverage.

Our study contributes to a better understanding of how VCs exit their investments. We also provide support for incomplete financial contracting theories developed by Aghion and Bolton (1992) and Hellmann (2006). In addition, our results provide the first evidence that firms' choice of corporate law can affect financial outcomes in nonpublic companies.

Our work suggests a number of interesting avenues for future research. It would be worth investigating sales of VC-backed firms in locations outside Silicon Valley and in other time periods to determine whether our findings generalize to other settings. Because firms are usually incorporated either in their home state or in Delaware, a study of sales outside California would enable researchers to test the difference between Delaware law and the laws of other states. This, in turn, could enable researchers to better determine the specific features of corporate law that tend to give common shareholders more power relative to VCs. It would also be worthwhile to examine the ex ante effects of common shareholder power, such as whether it affects not only how VCs exit but also when they exit. We hope our study convinces scholars of the interest and importance of pursuing such research and is useful to courts, legislatures, and practitioners seeking to better understand and improve the corporate governance of VC-backed firms.

Appendix A. Sensitivity to unobserved variables

We estimate the sensitivity of our findings to omitted variables using a technique developed by Altonji, Elder, and Taber (2005). Their analysis assumes that the variables included in a model are chosen randomly from the vector of all characteristics (observable and unobservable) that determine the dependent variable. Under this assumption they prove that (a) the normalized shift in the unobservables conditioned on the relevant treatment variable equals (b) the equivalent shift in the observables. In other words, selection on the unobservables equals selection on the observables. However, researchers do not randomly select which variables to measure but intentionally choose variables to reduce bias, suggesting that the amount of selection on the unobservables generally is less than the amount of selection on the observables.

Table A1
Data for calculating implied ratio of Eq. (3)/Eq. (4).

Power variables	β	$[E(X'\gamma\|C{=}1)-E(X'\gamma\|C{=}0)]/var(X'\gamma)$	$var(\varepsilon)$	$var(C)/var(\mu)$	Implied $[E(\varepsilon\|C{=}1)-E(\varepsilon\|C{=}0)]$	Implied ratio
Board Blocking	−0.055	4.214	0.0014	1.633	−0.034	−5.627
California	−0.035	14.631	0.0014	1.386	−0.025	−1.212

Thus, Altonji, Elder, and Taber (2005) argue that the amount of selection on the observables can be treated as an upper bound for the extent of omitted variable bias.

We apply Altonji, Elder, and Taber's technique to estimate the sensitivity of our results to omitted variables. For each of our two treatment variables, we first measure the amount of selection on the other observed covariates, and then we calculate how much selection on the unobservables would be necessary for omitted variables to completely explain away our result. This gives us an implied ratio of selection on unobservables to selection on observables. If the implied ratio is greater than one the case for a causal link between the treatment variable and the dependent variable is strengthened.

The following analysis applies to our results reported in Table 7 under Model 8. The regression reported in Model 8 can be expressed as:

$$Y = \alpha + \beta C + X'\gamma + \varepsilon \tag{2}$$

where Y is the *Realization Rate*, C is the relevant power variable (*Board Blocking* or *California*), and X is a vector of all other included explanatory variables excluding the power variable. The concern is that $cov(C,\varepsilon)$ might not be zero. We compare the normalized shift in the unobservables conditioned on the relevant power variable [Eq. (3)] with the equivalent shift in the observables [Eq. (4)]:

$$\frac{E(\varepsilon|C=1) - E(\varepsilon|C=0)}{var(\varepsilon)} \tag{3}$$

and

$$\frac{E(X'\gamma|C=1) - E(X'\gamma|C=0)}{var(X'\gamma)} \tag{4}$$

where $X'\gamma$ are fitted values from regression Model 8 predicting *Realization Rate* but excluding the relevant power variable, and ε represents associated residuals. Our goal is to calculate the implied ratio of Eqs. (3) over (4) that would be necessary to explain away the entire estimated effect for each of the following treatment variables: *Board Blocking* and *California*.

Let $X'\delta$ and μ represent the predicted value and residuals of a regression of C on X, such that $C{=}X'\delta{+}\mu$. Substituting into Eq. (2) results in

$$Y = \alpha + X'(\beta\delta + \gamma) + \beta\mu + \varepsilon. \tag{5}$$

Because μ is orthogonal to X we can express the bias in our estimate for β as

$$\begin{aligned}\text{Plim}\, b &= \beta + [cov(\mu,\varepsilon)/var(\mu)] \\ &= \beta + [var(C)/var(\mu)][E(\varepsilon|C=1) - E(\varepsilon|C=0)].\end{aligned} \tag{6}$$

Our strategy is to find the implied value of $[E(\varepsilon|C{=}1){-}E(\varepsilon|C{=}0)]$ that would cause the bias term to exactly wash out the estimate for β. This can then be substituted into Eq. (3).

Our implied estimate for $[E(\varepsilon|C{=}1){-}E(\varepsilon|C{=}0)]$ equals $\beta/[var(C)/var(\mu)]$. We can solve for this because Model 8 gives us $\beta{=}{-}0.055$ and $[var(C)/var(\mu)]{=}1.633$. This provides an implied estimate $[E(\varepsilon|C{=}1){-}E(\varepsilon|C{=}0)]{=}{-}0.034$, which would exactly explain away our entire estimate for β. Our estimate for $[E(X'\gamma|C{=}1){-}E(X'\gamma|C{=}0)]/var(X'\gamma)$ is 4.214 and var(ε) is 0.0014. This provides sufficient information to construct the implied ratio of Eqs. (3) over (4), which we find to be 5.627 in absolute value. To explain away the entire estimated effect of *Board Blocking* on *Realization Rate*, the unobservables would have to explain 5.6 times the variance in C as can be explained by the observables.

Using the data reported in Table A1 we can use the same steps to calculate the implied ratio for *California*. For *California* we find a ratio of −1.21. Because this is greater than one in absolute value, following Altonji, Elder, and Taber (2005), we consider it unlikely that omitted variables could explain away our findings. Our result for *California*, however, is less robust than our result for *Board Blocking*.

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