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Venture Capital and Corporate Governance in the Newly Public Firm*

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Abstract. I examine the effects of venture capital backing on the corporate governance of the entrepreneurial firm at the time of transition from private to public ownership. Using a selection model framework that instruments for venture backing with variations in the supply of venture capital, I conduct three sets of tests comparing corporate governance in venture- and non–venture-backed initial public offering (IPO) firms. Venture-backed firms have lower levels of earnings management, more positive reactions to the adoption of shareholder rights agreements, and more independent board structures than similar non–venture-backed firms, consistent with better governance. These effects are not common to all pre-IPO large shareholders.

JEL Classification: G24, G34

1. Introduction

Traditional economic theories largely view the entrepreneurial firm's transition from private to public ownership as a graduation date when all companies, regardless of prior financing and influences, are subject to the same rules and pressures of the public market. This literature often assumes that entrepreneurs, as principals, establish governance structures at the time a firm first enters the public markets to

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minimize the agency costs that arise from the separation of ownership and control (Jensen and Meckling, 1976; Grossman and Hart, 1988; Zingales, 1995). Such theories imply that similar firms should have similar governance structures at initial public offering (IPO), regardless of pre-IPO financing or intermediation.

More recent studies, however, suggest that moral hazard problems may be an issue at the time of IPO. For example, Brennan and Franks (1997) argue that entrepreneurs take steps at the time of IPO to ensure continuation of their private benefits of control once the firm's stock is traded on public markets. Klausner and Daines (2001) find that anti-takeover provisions are common in IPO-stage charters and that these anti-takeover provisions cannot be explained by efficiency theories, save the preservation of private benefits of control. Similarly, Field and Karpoff (2002) find that many firms deploy takeover defenses at the time of IPO and that this effect is particularly strong when oversight from non-managerial shareholders is weak. These findings suggest that agency costs are important even for entrepreneurial firms that reach the IPO stage and suggest that the involvement of financial intermediaries in the entrepreneurial firm pre-IPO may be able to play a role in mitigating the extent to which entrepreneurs entrench themselves or preserve their control benefits at the time of public offering.

In this paper, I examine the effect of the presence of a particular financial intermediary on the resulting governance structures put in place at the time of IPO: the venture capitalist (VC). Considerable pre-IPO evidence suggests that VCs may play a governance role in their portfolio firms. Kaplan and Stromberg (2003) document that VCs negotiate complex control rights at the time of their investment and put into place extensive monitoring and advisory systems. Hellmann and Puri (2002) indicate that VCs play a role in CEO turnover. Gompers (1995) and Lerner (1995) provide evidence of a VC monitoring function.

While many studies of financial intermediaries model the VC as a provider of funds and services to entrepreneurs, with the VC exiting and ending their involvement at the time of IPO, empirically it is well known that VCs retain substantial equity stakes for significant periods of time after their portfolio companies go public, ranging from the length of the typical lockup period of 180 days to many years post-IPO (Barry, Muscarella, and Vetsuypens, 1990). At the same time, studies of VC contracts (Kaplan and Stromberg, 2003; Kaplan *et al.*, 2007) indicate that VCs generally give up their excess control rights at the time the firm goes public. Both the VC's compensation and their ability to raise further funds are dependent on their investment returns. These returns, the key measure used by limited partners (LPs) to determine VC fund performance, are determined by the share price at the time the VCs sell or distribute their stake in their portfolio firms. As a result, VCs have incentives to ensure that optimal governance systems are in place in their portfolio firms at the time the firm goes public in order to ensure the preservation of the value of their investment until their positions have been unwound and their profits booked.

To examine whether VCs have an effect on the resulting governance structure of the IPO firm, I conduct three sets of tests comparing governance- and monitoring-related variables for venture- and non–venture-backed firms. Ideally, this issue would be examined using a comprehensive database of governance measures such as the Investor Responsibility Research Center (IRRC) data described in Gompers, Ishii, and Metrick (2003). However, the IRRC provides data only on companies drawn from the Standard & Poor's 500 as well as the annual lists of the largest corporations in the publications of *Fortune*, *Forbes* and *Business Week*. As no similarly comprehensive public database of governance measures exists for young IPO firms, I instead take a three-pronged approach. First, I examine a symptom of weak governance at the firm. Second, I examine the market's perception of governance at the firm. Third, I examine a set of directly observable governance structures.

As a symptom of weak governance at the firm, I compare the extent to which firms manage earnings and whether they employ conservative or aggressive accounting. To deduce the market's perception of shareholder protection and governance at the firm, I look at how the market reacts when the firm announces the adoption of a shareholder rights agreement (SRA). If management is acting as a perfect agent of shareholders, rights plans can be used to further shareholder interests by forcing bidders to negotiate higher takeover premiums or by reducing the threat of a hostile takeover, thus allowing the firm to employ more efficient performance-based deferred compensation contracts. Alternatively, if governance is weak, rights agreements can be used to entrench management and ward off value-increasing takeovers. The markets' reaction to adoption of a plan can be taken as an indication of how the market regards the governance of the firm. I then look directly at observable characteristics of the boards of directors of the sample firms at the time of IPO. I examine board composition, audit and compensation committee composition, and CEO/chairman duality. More independent board structures contribute to better monitoring of management and decision making that follows shareholder interests.

Identifying differences in governance structures and related measures between venture- and non–venture-backed firms is nontrivial. To identify causal effects, I must first address the fact that the choice of which firms receive venture funding *ex ante* is endogenous.[1] Venture firms select portfolio companies and entrepreneurs based on a wide variety of preferred characteristics, and some of these characteristics may later effect how the entrepreneur chooses to govern his firm. Omitted variable bias is also a concern, as the amount of information on firm characteristics that can be included as direct controls in the models is limited. The tests therefore employ a binary treatment model approach that attempts to control for both the endogeneity of venture financing and omitted variable concerns. The treatment

[1] The problem of endogeneity in the VC setting is well known. See Sorensen (2007) for work that models endogeneity explicitly in a setting confined to the universe of firms that receive venture backing.

models use instrumental variables related to the supply of venture capital at the time the entrepreneurial companies are first founded, which are unlikely to be related to governance structures at the time of IPO some five to seven years later.

The results of the three analyses are consistent with VCs producing stronger corporate governance in the startup companies they fund. Venture backing indeed appears to reduce the level of earnings management in the firm at IPO, as proxied for by discretionary accruals. Venture-backed firms are more likely to be "conservative" and are less likely to be "aggressive" in terms of earnings management than similar non–venture-backed firms. Furthermore, venture-backed firms experience significantly higher abnormal returns upon the announcement of the adoption of an SRA than do non–venture-backed firms. The wealth effect at the announcement is positive for venture-backed firms but is not so for non–venture-backed firms, suggesting that venture-backed firms are more likely to use the rights agreements to protect shareholder interests. Finally, venture-backed firms have more independent board structures at the time of IPO. Venture-backed firms have a higher proportion of outsiders on their board and a lower proportion of insiders[2] than do similar non–venture-backed firms. Their boards are less likely to be insider dominated, and they are less likely to have a dual CEO/chairman. Furthermore, venture-backed firms tend to have more independent audit and compensation committee structures.

Controlling for the endogeneity of venture financing using the selection model increases, rather than decreases, the magnitude of the effect of venture backing on governance measures. While the binary treatment framework (or any instrumental variables approach) cannot provide a perfect control for the endogeneity problem in the absence of a natural experiment, these patterns are encouraging and suggest that the documented effects are not solely the result of *ex ante* selection. Furthermore, the estimates from the selection models suggest that if selection occurs, it is such that VCs select firms whose (unobservable) characteristics made them less likely *ex ante* to be well governed if left to their own devices. One possible explanation for these findings is that venture capital firms may be selecting entrepreneurs who have a certain degree of overconfidence or aggressiveness or that entrepreneurs with these qualities are more likely to seek VC funding in the first place. These qualities can contribute in both positive and negative fashions to the management of an entrepreneurial business.[3] The VC may be interested in harnessing the positive aspects of these characteristics, while remaining aware of the need to rein in the negative aspects.

An additional item of interest is whether these effects are VC specific or merely common to all large shareholders. I find evidence that other types of large pre-IPO

[2] The difference is made up of grey directors, who have business ties or other affiliation with the firm but are not directly or formerly employed by the firm.

[3] See Gervais and Goldstein (2007) for a model of a team where the overconfidence of some players enhances team performance and may even create a Pareto improvement at the individual level.

shareholders, namely corporate and angel investors, do not have the same significant effects on governance that VCs have. Thus, it appears that the VC, with his hands-on active involvement in the pre-IPO stage, may have a greater effect on post-IPO governance than do other types of pre-IPO large shareholders, consistent with differences in the incentives and involvement of different types of pre-IPO financial intermediaries and investors.

The contribution of this paper is three-fold. First, the paper contributes to an emerging body of literature on governance in newly public firms. While there is a large body of literature examining corporate governance practices in established firms, there have been relatively few studies addressing the nature of corporate governance mechanisms in newly public firms or entrepreneurial firms in general. Other papers in this vein include Klausner and Daines (2004), who examine the governance of spinoff firms and equity carve-outs, and Klausner and Daines (2001) and Field and Karpoff (2002), who examine takeover defenses in IPO firms. The results of this study are consistent with the existence of moral hazard problems at the time of IPO, as suggested by Brennan and Franks (1997) and Field and Karpoff (2002), and suggests one possible source of the observed heterogeneity in the governance structures of IPO firms.

Second, this study contributes to the body of literature examining the role that financial intermediaries play in the building of entrepreneurial firms. Prior evidence on the value-added role of the VC has largely been related to the pre-IPO development stage of the firm (Hellmann and Puri, 2000, 2002; Hochberg, Ljungqvist, and Lu 2007; Lindsey, 2008). Other related studies on venture capital in the pre-IPO stage include Kaplan and Stromberg (2003, 2004), whose findings regarding venture capital contracting in the *ex ante* stage are complementary to my findings on governance effects *ex post*.

Additional work examines the monitoring function of venture capital in the pre-IPO stage (see, e.g., Gompers, 1995; Lerner, 1995); however, these papers use samples that contain only venture-backed firms. Consequentially, they rely on changes over time and differences within venture-backed firms as opposed to differences between venture- and non–venture-backed firms. Closer to this study is the work of Baker and Gompers (2003), who examine the role of venture capital in board size and composition at the time of IPO, considering both as the outcome of a bargain between the CEO and outside shareholders. The findings in this paper reconfirm effects documented in their study and expand upon them with a broad study of other board characteristics as well as other indicators that shed light on the governance of the firm.

Finally, my results shed light on the uniqueness of VCs as financial intermediaries relative to other pre-IPO large stakeholders. Other large shareholders, such as corporate and angel investors, do appear to influence the governance of the entrepreneurial firm in the same fashion as VCs. My findings add further evidence as to

the importance of the active involvement and control rights characteristic of VC investments for maximizing resulting portfolio company value.

The remainder of the paper is organized as follows. Section 2 describes the data and methodology used in the study. Section 3 examines a symptom of weak governance: earnings management. Section 4 examines market reactions to the announcement of the adoption of an SRA by venture- and non–venture-backed IPO firms. Section 5 looks at the characteristics of the boards of directors of the two sets of firms. Section 6 examines whether the documented effects are VC specific or a more general large shareholder effect. Section 7 concludes.

2. Data and Methodology

The initial sample used for this study consists of 2,827 IPOs taking place in the years 1983–1994[4], obtained from the Securities Data Corporation (SDC) Global New Issues database. To be included in the sample, an IPO firm must meet the following criteria: (i) the offer price is at least 5 dollars; (ii) the IPO proceeds are at least 1 million dollars; (iii) the issue is listed on the Center for Research in Security Prices (CRSP) tapes within 3 months of the issue; and (iv) the issue is not a reverse Leveraged Buyout (LBO), the IPO of a financial or financial-services firm (SIC code 6000–6999), a unit issue, a real-estate investment trust, or a corporate spinoff or equity carve-out. The CRSP database is used to identify the market capitalization of the firm, based on first closing price for the issue and the number of shares outstanding.

Descriptive statistics for the sample are presented in Panel A of Table I. Of the 2,827 firms in the sample, 1,041 are identified as venture-backed firms by the SDC. The proportion of venture-backed firms in the sample varies over time. Thirty percent of the 1983 IPOs received venture capital financing. The percentage of venture-backed firms remains in the mid- to high twenties until 1988, when it rises back to 30%. In 1989 and 1990, the percentage of venture-backed firms is roughly 40%, and the percentage peaks in 1991, with 52% of the firms venture backed, falling over time to 36% in 1994.

The mean firm size for the overall sample is $132 million. Venture-backed IPOs are larger, with a mean market capitalization of $154 million versus $119 million for non–venture-backed firms. IPO gross proceeds are obtained from SDC. The mean IPO proceeds for the overall sample is $23.4 million. The mean proceeds for venture-backed firms ($25.4 million) is only slightly higher than for non–venture-backed firms ($22.2 million).

The financial accounting data and earnings data used in earnings management tests are collected from the Compustat industrial firm annual files and archives. I

[4] The choice of sample years was done to allow for post-IPO tracking of these firms without requiring the use of data from the Internet bubble period.

Table I. Summary statistics

Panel A presents summary statistics for the full sample of firms undertaking an IPO in the years 1983–1994, excluding REITs, unit issues, reverse LBOs, spinoffs, firms with proceeds under $1 million, firms with an offer price of less than $5, financial firms (SIC code 6—), and those firms that are not listed on the CRSP tapes within 3 months of the offer date. Size is computed as market capitalization on the first day of listing on CRSP tapes. Discretionary accruals are calculated using the cross-sectional version of the modified Jones (1991) model following the description in Appendix A. A firm is defined as having ''aggressive accounting'' practices if its level of discretionary accruals places it in the top decile of discretionary accruals for all firms in Compustat in that year. A firm is defined as having ''conservative accounting'' practices if its level of discretionary accruals places it in the bottom decile of discretionary accruals for all firms in Compustat in that year. Panel B presents summary statistics for the 1994 subsample for which board characteristics were hand collected from SEC filings. This sample includes 232 firms that conducted an IPO in 1994 and were listed on CRSP within 3 months of the offer date. The sample excludes REITs, unit issues, closed end funds, ADRs, reverse LBOs, spinoffs and equity carve-outs, and financial firms (SIC one-digit code 6). IPOs with an offer price less than 1 dollar per share or with total proceeds less than 1 million dollars are also excluded from the sample. Data are collected from SEC filings of prospectuses. Market capitalization is calculated from CRSP data on the first day of listing

	All issues			Venture backed			Non-venture backed		
At IPO variable	*N*	Mean	Standard deviation	*N*	Mean	Standard deviation	*N*	Mean	Standard deviation
Panel A: full sample									
General									
Size ($MM)	2,827	131.67	282.78	1,041	153.97	272.27	1,786	118.67	288.01
IPO proceeds ($MM)	2,779	23.38	43.63	1,033	25.35	36.59	1,746	22.21	47.27
Earnings management—IPO fiscal year									
Discretionary accruals (level)	1,798	0.068	0.345	768	0.032	0.323	1,030	0.095	0.358
I (aggressive accounting)	1,798	0.276	0.447	768	0.242	0.459	1,030	0.301	0.429
I (conservative accounting)	1,798	0.133	0.339	768	0.164	0.371	1,030	0.110	0.313
Panel B: 1994 subsample									
Board composition									
Number of board members	232	6.085	1.952	108	6.238	1.632	124	5.952	2.193
Fraction of insiders on board	232	0.421	0.202	108	0.320	0.148	124	0.509	0.203

Continued

Table I. (Continued)

At IPO variable	All issues			Venture backed			Non-venture backed		
	N	Mean	Standard deviation	*N*	Mean	Standard deviation	*N*	Mean	Standard deviation
Fraction of outsiders on board	232	0.533	0.212	108	0.651	0.154	124	0.429	0.202
Fraction of grey on board	232	0.045	0.093	108	0.029	0.068	124	0.060	0.109
Insider dominated	232	0.227	0.420	108	0.064	0.246	124	0.153	0.362
Outsider dominated	232	0.356	0.480	108	0.587	0.495	124	0.371	0.485
Committee characteristics									
Audit committee fully independent	232	0.532	0.500	108	0.770	0.422	124	0.323	0.469
Audit committee has no insiders	232	0.618	0.487	108	0.835	0.373	124	0.427	0.497
Compensation committee fully independent	232	0.468	0.500	108	0.697	0.462	124	0.266	0.362
Compensation committee has no insiders	232	0.588	0.498	108	0.771	0.422	124	0.371	0.485
Other board characteristics									
Chairman is the CEO	209	0.603	0.490	99	0.465	0.501	110	0.727	0.447
Number of VCs on board	–	–	–	108	1.642	1.067	–	–	–
Number of years >1 VC on board	–	–	–	108	3.055	3.072	–	–	–
Firm characteristics									
Market capitalization at listing	232	126.9	157.7	108	145.87	166.9	124	110.35	148.0
Incorporated in Delaware	232	0.532	0.500	108	0.587	0.495	124	0.484	0.582
CEO characteristics									
CEO age	232	49.08	7.983	108	48.07	7.032	124	49.96	8.660
CEO near retirement age (≥62)	232	0.086	0.281	108	0.018	0.135	124	0.145	0.354
CEO is founder	232	0.388	0.488	108	0.398	0.492	124	0.379	0.487
CEO tenure (years)	232	6.323	6.175	108	5.278	4.255	124	7.234	7.353

follow standard practice (e.g., Sloan, 1996) and calculate accruals as changes in the working capital accounts from the balance sheet:[5]

$$\mathrm{ACC}_{t,i} = \Delta\mathrm{CA}_{t,i} - \Delta\mathrm{CL}_{t,i} - \mathrm{DEP}_{t,i}. \quad (1)$$

$\Delta\mathrm{CA}_{t,i}$ is the change in noncash current assets or the sum of accounts receivable, inventories, and other miscellaneous assets. I calculate $\Delta\mathrm{CA}_{t,i}$ by taking the change in current total assets (Compustat Item 4) and subtracting from it the change in cash (Item 1). $\Delta\mathrm{CL}_{t,i}$ is the change in current liabilities not due to short-term debt and taxes payable, which is given by the change in total current liabilities (Item 5) minus the change in debt in current liabilities (Item 34) minus the change in income taxes payable (Item 71). Finally, DEP is depreciation and amortization (Item 14).

To obtain discretionary accruals for the IPO sample, I employ the Compustat industrial firm annual files and archives. I use the Fama-French 48-industry classification and omit industry-years which do not contain at least seven firm observations for the accruals decomposition regression. Following the description in Appendix A, I create a database of annual discretionary accruals for all firms in the Compustat universe for the fiscal years 1980–1996, using the cross-sectional version of the modified Jones (1991) model. The sample of IPOs is matched to this database by CUSIP identifiers.

To be included in the IPO year earnings management sample, firms must have data available in Compustat for the fiscal year prior to the IPO, as well as the fiscal year of the IPO. A total of 1,798 firms from the initial sample have data available for both years. Of these, 768 are venture backed and the remaining 1,030 are non–venture-backed proportions that are similar to those of the full initial sample of firms. As a robustness check and to ensure that the estimates are not unduly influenced by outliers, I follow Teoh, Welch, and Wong (1998a) and others in the accounting literature and winsorize the discretionary accruals data at the 1st and 99th percentile. All reported results are robust to other choices of winsorization cutoffs.

Summary statistics for the level of discretionary accruals are presented in Panel A of Table I. For the full sample of firms with for whom the requisite accounting data are available, the mean level of (scaled) discretionary accruals is 0.0682 or 6.82% of firm assets. For the venture-backed firms, the mean is 3.24% of firm assets, whereas for the non–venture-backed firms, the mean level of discretionary accruals is 9.49% of firm assets. In the full sample, 27.6% of the firms have discretionary accruals that place them in an "aggressive accounting" group in the fiscal year

[5] While the definition of accounting accruals is literally earnings minus cash flows, prior to 1987 and the issuance of Statement of Financial Accounting Standards 95 by the Financial Accounting Standards Board, the cash flow statement data are not available on Compustat. For consistency across years, the convention is therefore to use a balance sheet method to calculate accruals. Materially similar results are obtained when employing only the post-1987 sample and calculating accruals directly using the cash flow statement data.

of the IPO, defined by having a level of discretionary accruals in the top decile of discretionary accruals for all firms in Compustat for that year. For non–venture-backed firms, this percentage is 30.1%, and for venture-backed firms, it is 4.0%.[6] Additionally, 13.3% of the firms in the full sample fall into a "conservative accounting" group, defined as having a level of discretionary accruals in the bottom decile of discretionary accruals for all firms in Compustat for that year. For the non–venture-backed firms, the proportion falling into the conservative bucket is roughly 11%, similar to the population as a whole. For the venture-backed firms, the proportion is 16.4%, and the difference between the two is significant at the 1% level.

Data on adoption of SRAs are initially collected from the SDC poison pill database for all firms in the initial sample. The SDC database provides an announcement date for each firm. Each announcement date is verified by hand collecting press release and media announcement dates from LexisNexis and newswire services for each firm in the initial sample.[7] I am unable to verify any announcement date for a number of firms in the sample. For four other firms, some evidence can be found in related media coverage about the firm or its business partners that indicates that an SRA had been adopted but a specific announcement date cannot be located. Both these sets of firms are excluded from the analysis. I use the hand-collected announcement dates for all tests. The final sample consists of 170 firms that adopt an SRA within 3 years of the IPO date, for whom returns are available in CRSP and for whom an announcement date could be located and verified.

Using SEC filings from the Thomson Financial Global Access database, detailed data are hand collected on firm, CEO, and board characteristics for 232 firms that conducted their IPO in the year 1994.[8] For the remainder of this paper, I refer to this

[6] Clearly, the IPO firms in the sample are more likely to be in the aggressive accounting group than are the general population of firms, exactly 10% of which, by construction, fall into this group. The higher preponderance of IPO firms in the aggressive group relative to the universe of firms as whole may be attributable to reputational concerns on the part of established firms. If a history of aggressiveness incurs a reputational cost, established firms may try to avoid the aggressive category as much as possible. Since IPO firms have a lower survival probability, they may be more willing to be aggressive at the start, since, due to the probability of failure, they are less likely to incur the reputational cost at a later date. As they move away from the IPO and the survival probability increases, we would then expect to see that the fraction of these firms that fall into the aggressive group decreases toward the fraction in the general population of established firms. This is indeed apparent in the data.

[7] The announcement dates reported by the SDC were incorrect for approximately one quarter of the observations. In roughly half of these cases, the date reported by the SDC precedes the date of the company press release on the news wires or to the business media, and in half the cases, a press release or news announcement in the media precedes the date reported by the SDC.

[8] The choice of year was guided by the availability of PDF versions of SEC filings in the Thomson database, but the selection of the particular year is unlikely to have a material effect on the analysis. Data collection was limited to a single year due to the time-consuming nature of the collection from scanned filing images.

group of firms as the 1994 subsample. For each firm, data are collected from the IPO prospectus and subsequent proxy reports. I collect data on firm characteristics at the time of the IPO from the prospectus. I identify the year in which the firm was first incorporated or founded and the state in which the firm is incorporated. I further collect data on CEO characteristics. I identified CEO age, CEO tenure, and whether the CEO is a founder of the firm. Additionally, I collect data on board and board committee characteristics. Using the biographical information presented in the prospectus, in addition to the information on consulting and business transactions provided in the Certain Transactions section of the prospectus, I classify board members into three categories. I classify as outsiders all board members who have neither any affiliation with nor provide business services to the company. This excludes full- or part-time employees of the company; former employees and family members of employees; all of whom are classified as insiders; and lawyers, bankers, consultants, and any others that have substantial business ties to the firm, who are classified as grey directors.[9] I record the number of board members in each category, and the number of board committee members in each category.

For venture-backed firms, I collect data for each VC who invested in the firm and who had at least one representative on the board. I used the prospectus sections on Principal Shareholders, Certain Transactions, and the biographical information for the directors to identify possible VC candidates. I then identified the candidates as VCs using *Pratt's Guide to Venture Capital Sources*, Venture Economics, and Internet resources. I record the venture firm name, the year in which the VC first had a representative on the board, the total number of VCs on the board, and the percentage of firm stock held by the VC before the IPO and immediately post-IPO. For non–venture-backed firms, similar data are recorded for "active" pre-IPO large shareholders who are not employees or founders of the firm. A shareholder was considered an "active" large shareholder if he owns a 5% or greater stake in the firm pre-IPO and has board representation. For each pre-IPO large shareholder, I also identify the nature of the shareholder (corporate, individual/angel, etc.).

For the 1994 subsample, where the VC name is available, I use three proxies for venture firm experience. First, for every VC in the Venture Economics database, I

[9] VC board members are classified similarly. If the filings suggest or report an ongoing consulting relationship or close involvement of the VC firm in the IPO company, the VC is classified as a grey director. If the VC board member has an operational role in the company, the VC is classified as an insider. If the VC fund has no tie to the company other than his investment, the VC board member is classified as an outsider. VCs give up the majority of their excess control rights and involvement in the company at the time of the IPO and, at this point, have incentives that are more aligned with outside shareholders than with insiders or grey directors. To allow for other interpretations of the VC board member status, I present all analyses looking both at ratios of outsider representation and insider representation. This allows the reader to reinterpret results as if all VC board members without clear operational roles in the company were classified as grey directors.

obtain data on the vintage year of each of the firm's funds. From these data, I calculate the number of funds that the VC firm has raised since its inception by 1994, the IPO year for the firms in the subsample. Second, I identify the earlier of the inception year or the first fund vintage year as the founding year for the VC and used this to calculate VC firm age in the year 1994. Third, I obtain data on the number of portfolio firm IPOs for each VC in each year since inception and calculate the cumulative number of portfolio firm IPOs for the VC firm in 1994 since inception. I then hand match the experience proxies to the IPO firm subsample by venture firm name. I record the experience proxy for the VC firm that has had the longest presence on the IPO firm's board of directors, as well as the most experienced VC, and the average for all VC firms with board representation.

Panel B of Table I presents summary statistics for the 232 firms in the 1994 subsample for whom detailed information is hand collected from firm prospectuses. The table presents summary statistics for a variety of board composition, board committee, CEO, and firm characteristics. Venture-backed firms comprise a slightly higher proportion (46%) of the firms in the subsample than in the full sample of firms described above. As is the case for the full sample, venture-backed firms in the subsample are larger on average than non–venture-backed firms. The mean venture-backed firm has a market capitalization of $146 million versus $110 million for non–venture-backed firms. The mean board size, six directors, is about half that of the mean board size documented by studies of established firms (see, e.g., Yermack, 1997). Board size is similar for both the venture- and non–venture-backed firms.

2.1 METHODOLOGY AND INSTRUMENTAL VARIABLES

The primary concern in comparing governance structures and related outcomes for venture- and non–venture-backed firms is the endogeneity of which firms receive venture backing *ex ante*. Even if venture backing has no effect on corporate governance, we may observe a significant point estimate on the VC variable in the models if the firms that receive venture backing are inherently different than those firms who do not receive venture funding and therefore less likely in the first place to engage in the behavior under examination. On the extreme end, we may be concerned that better governed firms choose to be VC backed in the first place or are selected by VCs because they are better governed. However, in the vast majority of cases, firms seeking and receiving venture capital financing are organized as small groups of entrepreneurs, in many cases are not yet incorporated, and generally lack any type of governance structure per se. Indeed, studies such as Kaplan and Stromberg (2003) and Kaplan and Stromberg (2004) provide evidence indicating that initial governance structures are put in place only following the venture capital investment.

Nevertheless, to address this concern, my models employ a selection framework that addresses the endogeneity of the binary treatment variable VC. This selection

model is similar to the oft-used Heckman (1979) two-stage model, differing only in that in this setting, I observe the second-stage variable for all observations. The binary treatment model is described in detail in Greene (1997).

The equation estimated for the first stage is a probit model, where VC is the dependent variable, and the independent variables are indicator variables for firm industry as well as exogenous variables that serve a purpose similar to the instruments in an Instrumental Variables (IV) setting. These instruments should meet the standard exclusion restriction, that is, they should be correlated with the variable of interest, VC, but uncorrelated with the governance-related dependent variables in the second stage equations.

I employ two such variables in the first stage equations. Both variables are motivated by the supply of venture capital available to firms when they are founded. First, I include an indicator variable taking the value 1 if the firm was founded prior to 1980 and 0 otherwise. The institutionalization of the VC industry is commonly dated to three events, the two final and most critical of which were the 1980 Small Business Investment Act which redefined VC fund managers as business development companies rather than investment advisers, thus lowering their regulatory burdens and the 1980 Employee Retirement Income Security Act (ERISA) "Safe Harbor" regulation which sanctioned the limited partnerships which are the dominant organizational form in the industry.[10] Following these three events, the venture industry experienced enormous growth, as well as geographic expansion. Baker and Gompers (2003) use a similar indicator as an instrument for venture backing, arguing that the supply of venture capital and the proportion of firms that are venture-backed increased dramatically from 1980 onwards.

Second, I include the volume of money (in thousands of dollars) invested by the venture capital industry in the firm's headquarter state in the year in which it was founded or first incorporated.[11] This variable is motivated by the fact that when venture funds are more readily available in a startup's locale, the startup is more likely to be venture funded. As required for proper identification of the

[10] The first of the three events was the 1978 ERISA "Prudent Man" rule definition, which allowed pension funds to invest in higher risk asset classes, thus greatly increasing the capital that flowed into the venture capital industry.

[11] In some cases, data on the year in which the firm was first founded are unavailable from electronic sources such as SDC. For the 1994 subsample, for which these data were hand collected, the median number of years from founding to IPO is seven for both venture- and non–venture-backed firms. When data on the founding/incorporation year are missing, I therefore use the year 7 years before the IPO as the proxy for the year in which the firm was first founded. Data on the amount of money invested by the venture capital industry in each state each year are obtained from Venture Economics and are available for the years 1980 and onwards. Where the proxy for the year in which the firm was first founded is earlier than 1980, I use the 1980 numbers. Data on the headquarters state are available from SDC for 1,756 of the 1,798 firms.

selection models, both variables are correlated with being venture backed, yet are extremely unlikely to be correlated with the *ex post* governance structures of the firm at the time of IPO.

The models estimated for the second stage of the equation system have a governance-related variable on the LHS and a variety of controls in addition to the VC indicator as independent variables. The system is estimated by maximum likelihood, under the null hypothesis that the errors in the two equations, μ and ϵ, are correlated (see, e.g., Maddala, 1983; Greene, 1997). Standard errors are computed as per Heckman (1979).

3. Earnings Management

The notion of the "quality of earnings"—the degree to which reported earnings reflect the true operational health of a business—has long been a concern among both academics and financial practitioners. Under the accruals-based accounting system defined by Generally Accepted Accounting Principles (GAAP), firms are allowed considerable latitude in constructing their financial statements; merely changing from one set of legitimate accounting techniques to another can alter reported earnings considerably.[12]

Reported earnings are the sum of cash flows from operations and accounting adjustments called accruals. Positive accruals imply that the firm is recording earnings that are larger than the cash flow generated by its operations. Beneish (2001) argues that if earnings are managed, it is most likely to occur in the accrual (rather than cash flow) component of earnings. This earnings management can occur through a variety of managerial choices. For example, switching from one set of depreciation schedules to another, delaying the recognition of expenses, and accelerating the recognition of revenues, while all legitimate, can generate positive accruals and boost earnings.

Accruals are not, however, in and of themselves, *prima facie* evidence of earnings management. GAAP require firms, even those who seek to present transparent and informative financial statements, to record certain assets and liabilities in such a way that generates accruals. Additionally, cyclical variation in a firm's industry or changes in its lines of business alter the firm's working capital needs and generate positive accruals that are not due to earnings management.

Detecting earnings management requires a model to separate the nondiscretionary component of accruals from the discretionary component. The former represents the portion of accruals that is required under GAAP, while the latter is the portion

[12] More pernicious is the use of derivatives or complex legal structures to transfer certain liabilities off a balance sheet; such dubious accounting was central to the Enron bankruptcy of 2002 and the associated scandal.

of accruals that is due to managerial discretion. Dechow, Sloan, and Sweeney (1996) and Guay, Kothari, and Watts (1996) compare various models of discretionary accruals and conclude that a modified version of the Jones (1991) model is the most statistically powerful model for detecting earnings management. Subsequent authors adopt the modified Jones (1991) model as the discretionary accruals model of choice, and I follow this convention.

There is considerable empirical evidence of earnings management. Bagnoli and Watts (2000) suggest that relative performance evaluation leads firms to manage earnings if they expect competitors to do so. Similar arguments are found in Erickson and Wang (1999) in the context of mergers and Shivakumar (2000) in the context of seasoned equity offerings. Incentives for managing earnings upwards include raising stock prices prior to seasoned equity offerings (Rangan, 1998; Teoh, Welch, and Wong, 1998a), at IPOs (Teoh, Welch, and Wong, 1998b; DuCharme and Sefcik, 2001), and before stock-financed acquisitions (Erickson and Wang, 1999). Additionally, managers may raise earnings to meet analysts' expectations (Kasznik, 1997; DeGeorge, Patel, and Zeckhauser, 1999; Burgstahler and Eames, 2006), to avoid debt covenant violations (DeFond and Jiambalvo, 1994; Parker, 2000), or to smooth earnings. According to former SEC chairman Arthur Levitt,[13] earnings management is a widespread phenomenon among public companies under pressure to meet analyst expectations.

The costs of earnings management to investors are significant. Chan *et al.* (2006) find that firms with "conservative" earnings management, or "high earnings quality," have annual returns that are significantly greater than those of "low earnings quality" or "aggressive" earnings management firms. Teoh, Welch, and Wong (1998b) find that issuers in the most "aggressive" quartile of IPO firms have a 3-year after-market stock return of about 20% less than issuers in the most "conservative" quartile.[14]

In much of the accounting literature, income increasing, or "aggressive," earnings management is taken as a possible symptom of weak or problematic governance in

[13] "The Numbers Game," speech given at The NYU Center for Law and Business, September 28 1998.

[14] Investors' inability to separate good accounting numbers from bad may render them unable to distinguish between well-run firms with favorable growth prospects and firms with deceptive earnings. Indeed, there is evidence that accounting statements present a taxing cognitive challenge for even the most astute investors. Bernard and Thomas (1989) and Chan, Jegadeesh, and Lakonishok (1996) find that investors respond to new earnings announcements with a slight delay. This may be the result of the time-consuming challenging intellectual task of contemplating and processing new accounting data. Additionally, Mashruwala, Rajgopal, and Shevlin (2006) suggest that arbitrage risk may make accrual mispricing difficult to eliminate, as individual stocks in more extreme accrual groups do not have close substitutes. More specifically related to the setting in this paper, Collins, Gong, and Hribar (2003) find that limits to arbitrage in firms with low institutional holdings (such as IPO firms) may impede sophisticated investors from exploiting the seemingly large abnormal returns implied by high accruals.

firms. I begin by examining the level of discretionary accruals in the fiscal year of the IPO for venture- and non–venture-backed firms. As per Teoh, Welch, and Wong (1998a), higher discretionary accruals are considered to be "aggressive," while lower discretionary accruals are considered to be "conservative." As described in Section 2, in the univariate, the mean level of (scaled) discretionary accruals is 0.0682 or 6.82% of firm assets. For venture-backed firms, the mean is 3.24% of firm assets, whereas for non–venture-backed firms, the mean level of discretionary accruals is 9.49% of firm assets. The difference between the mean level of discretionary accruals for the venture- and non–venture-backed firms is 6.25% of firm assets and is significant at the 1% level. To control for factors that may make firms pre-disposed to manage earnings upwards, I estimate the following model:

$$\begin{aligned} \mathrm{DACC}_i = {} & \beta_{\mathrm{vc}}\mathrm{VC}_i + \beta_{\mathrm{sz}}\mathrm{SZ}_i + \beta_{\mathrm{bm}}\mathrm{BM}_i + \beta_{\mathrm{lev}}\mathrm{LEV}_i + \beta_{\mathrm{ibx}}\mathrm{S\Delta IBX}_i \\ & + \beta_{\mathrm{seo}}\mathrm{SEO}_i + \Gamma' \boldsymbol{Y}_i + \Theta' \boldsymbol{IND}_i + \epsilon_i, \end{aligned} \tag{2}$$

where DACC is the level of discretionary accruals for the firm in the fiscal year of IPO, VC is an indicator variable taking the value 1 if the firm is venture backed and 0 otherwise, *Y* are fixed effects for the fiscal year in which the IPO took place, and ***IND*** are industry fixed effects (one-digit SIC codes). SZ is the log of firm market capitalization (in millions of dollars) on the first day of listing on the CRSP tapes. On the one hand, larger firms with more complex financial statements may be more able to exploit latitude in accounting standards to manage earnings. Conversely, larger firms may also have reduced opportunity to exercise accounting discretion since they are more likely to be scrutinized by security analysts. BM is the firm's book-to-market ratio, calculated as the ratio of book equity at the beginning of the fiscal year (Compustat Item 60 plus Item 74) to market capitalization on the first day of listing. Higher growth firms may be more likely to experience high discretionary accruals, especially if the decomposition model contains some measure of imprecision. LEV is the firm's leverage ratio at the beginning of the fiscal year, calculated as 1 − (BOOK/TA), or one minus the ratio of book value of equity at the beginning of the fiscal year to total assets of the firm at the beginning of the fiscal year. The leverage ratio controls for the documented tendency of firms to manage earnings upwards in order to avoid violation of debt covenants. SΔIBX is the change in income before extraordinary items (Item 18) from the previous fiscal year to this year, scaled by the total assets of the firm at the beginning of the fiscal year. Dechow, Sloan, and Sweeney (1995) suggest that tests of earnings management may be misspecified if discretionary accruals are correlated with firm performance. Finally, SEO is an indicator variable taking the value 1 if the firm conducts a seasoned equity offering in the following fiscal year, as firms may manage earnings upwards prior to a seasoned equity offering. Data on SEO dates are obtained from SDC.

The first column of Table II presents the results of the estimation of Equation (2) for the firm's IPO fiscal year. The coefficient on VC is a negative 5.2% of firm assets and is significant at the 1% level. The loadings on the control variables are signed as expected. The coefficient on SZ is negative and significant, indicating that the larger the firm, the lower the level of discretionary accruals. This suggests that the added scrutiny applied to larger firms outweighs any added likelihood of exploiting accounting latitude for these firms. As expected, the coefficient on BM is negative and significant, and the coefficient on SΔIBX is positive and significant. The coefficients on LEV and SEO are also positive, as expected, but are not significant. Column 2 of the table reestimates this model using a Fama-McBeth panel regression framework. The results are qualitatively similar: the loading on VC remains negative and significant and is a slightly larger 6.5% of firm assets. The signs of the coefficients on the control variables remain the same, except for the sign on LEV, which reverses, but is not significant.[15]

Neither the fixed effects regression model nor the Fama-McBeth approach, however, address the endogeneity problem that arises from the selection issue of who receives venture capital in the first place. To address this concern, I reestimate Equation (2) using the selection framework described in Section 2.1. The results of the estimation of Equation 2 under the two-equation treatment model framework are presented in the third column of Table II. If the loading on VC documented above was attributable (even in part) to selection (i.e., firms that receive venture capital were *ex ante* less likely to manage earnings upwards), we would expect the correlation between the errors, ρ, to be negative and the estimate of the coefficient on VC to be reduced in magnitude. However, as can be seen from the table, the estimate of ρ is positive and the coefficient on VC grows in magnitude to -17.8% of firm assets and remains significant. The Wald test statistic for the null hypothesis of $\rho = 0$ is significant and rejects the null at the 5% level, indicating that while selection plays a part in the model, it is not selection of the nature that we may have been concerned about *ex ante*. The positive correlation coefficient implies that the firms that are selected to receive venture backing *ex ante* are those that would *ex post* be more likely to manage earnings upwards. The coefficients on the control variables remain close to their levels in the fixed effects estimation in the first column of the table, with similar significance.

These results might be considered surprising. As mentioned above, a "naive" selection story in this context might be that VCs select the "best" entrepreneurs and that best also includes entrepreneur characteristics "most honest" or "most likely to serve shareholder interests," or perhaps "most willing to give up control." One possible interpretation of this result is that the term "best" to the VC also

[15] In follow-on work to this study, Wongsunwai (2011) finds that these effects are stronger for VCs of higher quality.

Table II. Level of earnings management following IPO

This table presents the results of regression analysis of the level of earnings management in IPO firms, proxied for by the firm's discretionary accruals. All models test for the difference in the level of earnings management between venture- and non–venture-backed firms. The first set of tests uses a regression model with fixed effects for IPO year and industry. The second set of tests uses Fama-McBeth regressions. The third set of tests applies a treatment model to the fixed effects regressions in the first set of tests to control for the endogeneity of venture backing. The dependent variable in all tests is the level of discretionary accruals for the firm, based on the cross-sectional version of the modified Jones (1991) model for decomposition of accounting accruals into their expected and abnormal parts (a full description of the construction of the discretionary accruals can be found in Section 2 and Appendix A). The control variables in all tests are the log of the market capitalization of the firm (log size), the firm book-to-market ratio, leverage ratio, the change in earnings (income before extraordinary items) from the previous fiscal year, scaled by the total assets of the firm, and an indicator variable that takes the value 1 if the firm undertakes a seasoned equity offering in the following fiscal year. Results are presented for the fiscal year of the offering (i.e., the fiscal year during which the IPO took place), which includes both pre-IPO and post-IPO months, and for the fiscal year following the IPO. The coefficients on the IPO year and industry fixed effects are not reported for the sake of brevity. The independent variables in the selection equation of the treatment model are the dollar amount invested by the VC industry in the firm's headquarters state in the year of founding (as proxied for by the year 7 years prior to IPO) in millions of dollars, and industry indicator variables. As the VC investment amounts are not available prior to 1980, the 1980 data are used for all firms whose founding year proxy is prior to 1980, and an indicator variable taking the value 1 if the firm founding year proxy is prior to 1980 and0 otherwise, is also included. All tests use White (1980) heteroskedasticity-consistent robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels (for a two-sided test), respectively.

	Level of discretionary accruals					
	Fixed effects		Fama-McBeth		Treatment model	
Variable	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
IPO fiscal year						
Venture backing	−0.052	−3.01***	−0.065	−3.50***	−0.1782	−3.22***
Log size	−0.040	−5.84***	−0.036	−5.10***	−0.0391	−5.70***
Book-to-market	−0.006	−3.01***	−0.075	−1.49	−0.0061	−3.04***
Leverage ratio	0.014	1.21	−0.010	−0.35	0.0150	1.27
Change in earnings	0.083	2.27**	0.046	1.00	0.0867	2.37**
SEO indicator	0.025	1.11	0.032	0.91	0.0234	1.04
Year fixed effects	Included				Included	
Industry fixed effects	Included		Included		Included	
Correlation between test and treatment model errors, ρ					0.2385	
Wald test of $\rho = 0$ (independent equations)					5.54**	
Number of observations	1,798		1,798		1,756	
Treatment model						
Amount invested by VC industry in firm headquarters state in founding year					6.79×10^{-8}	6.94***
Founded before 1980					−0.2183	−3.11***
Industry indicators					Included	

includes possession of some degree of either aggressiveness or overconfidence. These two qualities can have both positive and negative effects on how an entrepreneur manages his business. The VC may wish to harness the positive aspects of these characteristics of the entrepreneur and be aware of the need to rein in the negative aspects, such as the tendency to manage earnings upwards. Alternatively, from the perspective of the entrepreneur choosing to seek venture capital financing, more aggressive entrepreneurs may be more likely to seek venture financing in the first place.

One concern that the binary treatment model addresses, in the context of VC in particular, is the lack of data on the characteristics of the private firms at the time they seek out funding save location and industry (economic interpretation of the treatment model precludes us from using ex post firm characteristics in the selection equation, as these are likely influenced by venture backing). As a result, I rely on the model to capture the effects of those unobservables that affect both ex ante selection and ex post governance. That said, the binary treatment model (or any instrumental variables approach), while commonly used to control for endogeneity in the corporate finance setting in the absence of a natural experiment, cannot provide a perfect control for endogeneity. Nonetheless, the results from treatment model are encouraging and suggest that the observed effect of VC backing on discretionary accruals levels are unlikely to be solely the result of ex ante selection.

Obviously, all tests performed using discretionary accruals data are, in effect, joint tests of the discretionary accruals model and of the hypotheses of interest. However, even if the modified Jones model does not capture earning management in its fullest, it likely provides, at a minimum, directionally useful data that can point to aggressive and conservative accounting practices. I identify the top decile of $DACC_{t,i}$ for all firms in the Compustat universe in fiscal year t as "aggressive accounting" and the bottom decile of $DACC_{t,i}$ for all firms in the Compustat universe in fiscal year t as "conservative accounting." I define two indicator variables, AGRS and CNSRV, that take the value 1 if the firm falls into the aggressive or conservative group, respectively, and 0 otherwise. In the full sample, 27.6% of firms have discretionary accruals that place them in the aggressive group in the fiscal year of the IPO. For non–venture-backed firms, this percentage is 30.1%, and for venture-backed firms, it is 24.0%. The difference in the percentages of the venture- and non–venture-backed sample falling into the aggressive group is roughly 6.1% and is significant at the 1% level. Additionally, 13.3% of the firms in the full sample fall into the conservative accounting group (versus 10.0% of the entire population of all firms, by construction). For the non–venture-backed firms, the proportion falling into the conservative bucket is roughly 11%, similar to the population as a whole. For the venture-backed firms, the proportion is 16.4%, and the difference between the two is significant at the 1% level. These univariate differences are consistent with the hypothesis that venture-backed firms are more likely

to fall into the conservative accounting practices group and are less likely to fall into the aggressive accounting practices group.

To confirm that these results are not attributable to other confounding issues and factors, I also analyze the variables AGRS and CNSRV in a probit framework. Table III presents the results of probit analyses of the two variables. I include the control variables used in Equation (2). The estimates from a naive probit analysis of AGRS (not adjusting for selection) are presented in the first column of the table. The loading on VC is −0.17 and is significant at the 5% level. Holding all other variables at their mean, this corresponds to a reduction of 0.054 in the probability of falling into the aggressive accounting group for venture-backed firms relative to non–venture-backed firms. The sign and significance levels on the control variables remain similar to the analysis of levels of DACC. Column 2 presents the estimates for the probit model under the binary treatment framework, which in this case reduces to a bivariate, seemingly unrelated probit setting (see Maddala, 1983; Greene, 1997 for a detailed description). Once again, the estimate of the correlation coefficient ρ is positive, suggesting that the reduction in the probability that venture-backed firms fall into the aggressive accounting group is underestimated by the univariate probit model. While the estimate of ρ is not significant, the loading on VC under the treatment model grows to −0.69, corresponding to a reduction of 0.23 in the probability that a venture-backed firm will fall into the aggressive accounting group, when all other variables are held at their means.

The estimates from the naive probit analysis of CNSRV are presented in the third column of the table. Here, the coefficient on VC is a positive 0.2182 and is significant at the 1% level, corresponding to an increase of 0.043 in the probability of being in the conservative accounting group for a venture-backed firm relative to a non–venture-backed firm, holding all other variables at their mean. Column 4 presents the estimates of the treatment model for CNSRV. Here, the estimate of the correlation coefficient is negative (as expected, based on the positive correlation with aggressiveness) and is significant at the 5% level. The loading on VC increases to 0.96, corresponding to an increase of 0.12 in the probability of being in the conservative accounting group for a venture-backed firm when all other variables are held at their means.[16]

Two alternative explanations for these results remain to be ruled out. As total accruals are reverting in nature, it is possible that the lower levels of discretionary accruals observed for venture-backed firms in the year of the IPO incorporate some reversion of the discretionary accruals from the previous, pre-IPO year, due to

[16] In unreported regressions, I also estimate the above models on data from the 1994 subsample, with the addition of controls for VC experience and length of involvement with the company. The results are qualitatively similar, save for the coefficient on VC in the probit analysis of conservative accounting, which loses significance (p value = 0.14). The coefficients on venture capital experience and tenure are not significant. Sufficient data from Compustat are available for 148 of the 232 firms in the subsample.

Table III. Aggressive and conservative earnings management following IPO

This table presents the results of probit analysis of the aggressive and conservative earnings management in IPO firms. The dependent variable in the first set of tests is an indicator variable taking the value 1 if the firm's level of discretionary accruals falls into the highest decile of discretionary accruals for all Compustat firms in that fiscal year (aggressive earnings management) and 0 otherwise. The dependent variable in the second set of tests is an indicator variable taking the value 1 if the firm's level of discretionary accruals falls into the lowest decile of discretionary accruals for all Compustat firms in that fiscal year (conservative earnings management) and 0 otherwise. The level of discretionary accruals is calculated based on the cross-sectional version of the modified Jones (1991) model (a full description of the construction of the discretionary accruals can be found in Section 3). For each dependent variable, results are reported for both a probit model with indicators for IPO year and industry and a treatment model which controls for the endogeneity of venture backing. The control variables in all tests are the log of the market capitalization of the firm (log size), the firm book-to-market ratio, leverage ratio, the change in earnings (income before extraordinary items) from the previous fiscal year, scaled by the total assets of the firm, and an indicator variable that takes the value 1 if the firm undertakes a seasoned equity offering in the following fiscal year. Results are presented for the fiscal year of the offering (i.e., the fiscal year during which the IPO took place), which includes both pre-IPO and post-IPO months. The coefficients on the indicators for IPO year and industry are not reported here for the sake of brevity. The independent variables in the selection equation of the treatment model are the dollar amount invested by the VC industry in the firm's headquarters state in the year of founding (as proxied for by the year 7 years prior to IPO) in millions of dollars and industry indicator variables. Since the VC investment amounts are not available prior to 1980, the 1980 data are used for all firms whose founding year proxy is prior to 1980, and an indicator variable taking the value 1 if the firm founding year proxy is prior to 1980 and 0 otherwise, is also included. All tests use White (1980) heteroskedasticity-consistent robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels (for a two-sided test), respectively.

	Aggressive accounting				Conservative accounting			
	Probit		Treatment model		Probit		Treatment model	
Variable	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics
IPO fiscal year								
Venture backing	−0.1708	−2.41**	−0.6967	−1.84*	0.2182	2.64***	0.9552	3.13***
Log size	−0.2449	−7.91***	−0.2406	−7.15***	0.0268	0.77	0.0202	0.60
Book-to-market	−0.5384	−3.73***	−0.4899	−3.66***	−0.4679	−2.76***	−0.4112	−2.70***
Leverage ratio	0.0232	0.61	0.0258	0.67	0.0601	1.46	0.0540	1.35
Change in earnings	0.2347	2.79***	0.2345	3.12***	−0.1722	−2.03**	−0.1813	−2.70***
SEO indicator	0.0985	1.08	0.1056	1.16	−0.0624	−0.57	−0.0367	−0.36
Year indicators	Included		Included		Included		Included	

Continued

Table III. (Continued)

	Aggressive accounting				Conservative accounting			
	Probit		Treatment model		Probit		Treatment model	
Variable	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics
Industry indicators	Included		Included		Included		Included	
Correlation between test and treatment model errors, ρ				0.3368				−0.4765
Wald test of $\rho = 0$ (independent equations), χ^2				1.76				4.36**
Number of observations	1,798		1,756		1,798		1,756	
Treatment model								
Amount invested by VC industry in firm headquarters state in founding year			6.61×10^{-8}	6.79***			6.86×10^{-8}	7.24***
Founded before 1980			−0.2244	−3.15***			−0.2127	−3.00***
Industry indicators			Included				Included	

imprecision in the decomposition model. A second, related, concern is that the lower levels of discretionary accruals for venture backed firms in the IPO year are due to "banking" of earnings by venture-backed firms, which may then use these accumulated accruals to manage earnings upwards in following years, as the VCs exit their investments.

If venture-backed firms "window dress" their earnings numbers in the fiscal year prior to IPO by managing earnings upwards, some of the reversion in total accruals may be captured in the discretionary accruals of the fiscal year of the IPO. This scenario is unlikely, as VCs typically hold a considerable portion of their investments for some time after the IPO. Teoh, Welch, and Wong (1998b) find that issuers in the most "aggressive" quartile of IPO firms have a 3-year after-market stock return of about 20% less than issuers in the most "conservative" quartile. Thus, the benefits to the VC of "window dressing" at the IPO, only to experience significantly lower returns during the period they dispose of the bulk of their stake, is not clear. Still, to rule out this possibility, I examine the discretionary accruals in the fiscal year prior to IPO for the 186 firms for whom sufficient data are available in Compustat for the years preceding the IPO. Of these 186 firms with sufficient available data to calculate discretionary accruals, 77 are venture-backed and 109 are non-venture backed, proportions similar to those in the full sample and in the IPO fiscal year sample. I repeat the above analyses for the fiscal year prior to IPO, with qualitatively similar results. As is the case in the fiscal year of the IPO, discretionary accruals are significantly lower for venture-backed firms (−0.313) than for non–venture-backed firms (−0.004). Thus, it does not appear that the lower earnings management for venture-backed firms is the result of the proxy capturing reversion in window-dressed accruals from the year preceding IPO.

Similarly, it is possible that VC-influenced companies are "banking" earnings in the IPO year to produce a cushion with which to manage earnings upwards in the following fiscal year(s), prior to the VC selling or distributing his shares. While at first glance this explanation is intuitively inviting, a closer examination of the VC's situation suggests it is unlikely as well. First, VCs typically give up excess control rights, such as board control, voting control, etc., at the time of the IPO. Consequently, it is not clear how much influence the VC has on the reporting and management of earnings following the IPO. If the VCs put in place strong governance structures to protect their investment once they no longer have control rights, they may not be able to override these mechanisms in order to manage earnings at times of their choosing. Additionally, VC investment is a repeated game. VCs need to raise follow-on funds, and typically, raising these funds from existing LPs is likely to be easier than attracting new investors (Hochberg, Ljungqvist, and Vissing-Jorgensen, 2010). Furthermore, one of the primary vehicles for return of capital to LPs is the distribution of shares. LPs wishing to realize cash gains must then find

a vehicle to sell these large blocks of shares in the open market.[17] When considering an investment in a VC's follow-on fund, LPs may recall not only the VC's officially reported return (based on the price at the time shares were distributed) but also whether these shares continued to perform well until such point that the LPs exited or whether they fell in value following their distribution due to the correction in the market as the true state of the firm is revealed in following quarters.[18]

To formally rule out this alternative explanation, I repeat the above analyses of discretionary accruals for the firms in the sample for the following two fiscal years after the IPO. The results of these analyses are qualitatively similar to those of the IPO fiscal year. Thus, it does not appear that the lower earnings management for venture-backed firm in the IPO year is a result of VCs banking earnings in the IPO year and then managing earnings upwards in later years prior to exiting their investments.

The analyses above are consistent with the argument that venture backing reduces earnings management in newly public firms. Firms with venture backing are more likely to be on the conservative end of the financial accounting scale than are similar non–venture-backed firms and are less likely to be on the aggressive end of the scale. Furthermore, when adjusting for the possible endogeneity arising from selection, these tendencies are strengthened. Firms that receive venture backing appear to be those that were more likely to have higher levels of earnings management or to engage more aggressive accounting practices in the first place.

Having examined a set of variables that proxy for a symptom of governance problems in the firm, I next attempt to ascertain whether the market believes that the firm is likely to make decisions in the best interests of shareholders, by examining the market reaction to the announcement of the adoption of an SRA.

4. Wealth Effects at the Adoption of SRAs

SRAs[19] are securities issued to company shareholders entitling them to special rights and privileges if the company becomes the target of a takeover bid. While there are many types of SRAs and while they vary in their potency, all SRAs increase the power of the board of directors by making non-negotiated takeovers more costly for the bidding firm.

[17] Typically, these blocks are either sold or held for a considerable period through distribution management services offered by investment managers to LPs. As large block trades will have price impacts, selling a distributed stake may take a considerable time.

[18] More colloquially, LPs are likely to remember whether the VC distributed shares of eBay (a company that has continued to perform) or whether he distributed shares of Media Vision Technology (which plummeted into bankruptcy shortly following VC distribution of shares).

[19] SRAs are also commonly referred to as "poison pills."

Two central hypotheses are routinely cited to explain the adoption of rights agreements. Typically, management cites shareholder-wealth maximization as the purpose of the rights agreement. SRAs can deter two-tier takeover bids that induce shareholders to sell their shares for a lower price. If management acts as a perfect agent of shareholders, the SRA can be used to force the bidder to negotiate a higher control premium. Moreover, by reducing the threat of a hostile takeover, the firm may be able to employ more efficient performance-based deferred compensation contracts (Knoeber, 1986).

On the other hand, critics tend to argue that SRAs entrench current management at the expense of shareholders. Conflicts of interest in the event of a takeover may result in management employing a rights defense to ward off a value-increasing change of control. If fear of a takeover motivates management, reducing the threat of takeover should have a negative effect on share prices. If takeover defenses raise the cost of replacing inefficient management, shareholder wealth will be reduced.

The market's reaction to the adoption of an SRA by the IPO firm can thus provide us with an indication of the market's perception of governance and shareholder protection at the firm. If governance structures in place in venture-backed firms are indeed less entrenching than those of similar non–venture-backed firms and if these firms have governance structures and policies that make them more likely to act in shareholders' best interests, then the wealth effect of the adoption of a rights agreement by venture-backed firms should be more positive (or less negative) than that of non–venture-backed firms.[20]

I focus my analysis on the stock-market return of the firms over the 2-day period during which the adoption of the SRA is announced. This announcement period consists of the first day on which the rights agreement adoption is announced by the media and the following trading day.[21] Following Malatesta and Walkling (1988) and Brickley, Coles, and Terry (1994), I calculate abnormal returns over the announcement period on the basis of a market model. Denote by R_{jt} the return to stock j, measured over the tth 2-day interval, and by R_{mt} the market index return over the same period. Under the market model, the 2-day abnormal stock return is calculated as

$$\mathrm{AR}_{jt} = R_{jt} - (\alpha_j + \beta_j R_{mt}), \tag{3}$$

[20] As the object of interest in this hypothesis is the market reaction to a SRA adoption and not the act of adoption of the rights agreement itself, I do not collect information on the relative likelihood of adopting a pill pre- or post-IPO. In this setting, the SRA is a tool that can be used for positive or negative purposes, depending on the strength of the governance of the firm.

[21] This 2-day period is selected due to the inability to assign a specific time stamp to the press announcement on the announcement date.

where the parameters α_j and β_j are estimated by ordinary least squares (OLS) using the sixty 2-day return pairs (R_{jt}, R_{mt}) over the interval from 140 to 20 trading days prior to the announcement date.[22] Standardized prediction errors are calculated as per Dodd and Warner (1983) and Mikkelson and Partch (1985).

Of the 170 firms that adopt an SRA within 3 years of IPO for whom the announcement date could be verified, two adopt the plans too close to IPO to allow for the calculation of the abnormal return via the market model. This leaves a sample of 168 firms for whom the 2-day beta-adjusted abnormal return can be calculated and the full 170 firms for whom the 2-day excess-of-market abnormal returns can be calculated. Of these, 122 firms are venture backed and 48 are non-venture backed.[23]

Table IV presents the announcement period mean cumulative abnormal returns for the venture-backed, non–venture-backed, and full samples.[24] For the full sample, the mean cumulative abnormal return is a positive 1.18% and is significantly different from zero at the 5% level.[25] For the venture-backed firms, the mean 2-day CAR is a positive 1.70% and is significant at the 1% level. For the non–venture-backed firms, the mean 2-day CAR is a negative 0.22% and is not significantly different from zero. The results are similar when employing the stock-return-excess-of-the-market instead of the return-from-the-market model. For the full sample, the 2-day excess-of-market CAR is a positive 1.05% and is significant at the

[22] A number of different estimation intervals were tried, and the results were unaffected.

[23] The predominance of venture-backed firms in the sample differs greatly from their relative proportion in the full sample of firms. One possible explanation for this is that if the non–venture-backed firm knows that the market's reaction to the adoption of a rights agreement will be negative, it may choose not to adopt the rights agreement unless it feels it is truly necessary. If this is the case, it would also reduce the magnitude and significance levels of any result found in the data, as the effect may have been stronger if the non–venture-backed firms chose to adopt the rights agreement, and I observed the negative impact on share price. Alternatively, this may be the result of more active governance on the part of venture-backed firms, who may be more likely to adopt structures that have the potential to benefit shareholders.

[24] Historically, empirical studies show that on average, the adoption of SRA takeover defenses has a negative effect on shareholder wealth (see, e.g., Malatesta and Walkling, 1988; Ryngaert, 1988). More recent studies, however, find insignificant average stock price reactions to SRA adoptions (see, e.g., Brickley, Coles, and Terry, 1994; Comment and Schwert, 1995; Danielson and Karpoff, 2006).

[25] This result differs from the findings of previous studies, which conclude that the wealth effect from the adoption of a poison pill is either slightly negative or insignificant. One explanation for this result is that the population of firms being examined in this study differs from the population of firms examined in past studies since I examine the adoption of poison pills by IPO firms rather than the full population of public firms. Additionally, the sample is further restricted by the elimination of spinoff IPOs, which Klausner and Daines (2002) suggest may have more entrenching governance structures than do other IPO firms. Indeed, when spinoff firms are included in the analysis the mean abnormal return is insignificantly different from zero (though all other results below regarding the venture- and non–venture-backed groups remain qualitatively similar if not strengthened).

Table IV. Wealth effect at adoption of shareholder rights agreement

This table presents the effect on shareholder wealth of the adoption of SRAs (also known as poison pills) by IPO firms, within 3 years of IPO. I include only the first time a rights agreement is adopted (and not subsequent amendments). The effect on shareholder wealth is measured both by the 2-day CAR from a market model and the straight excess-over-market return, measured as the return on the announcement day and the day following ([0, 1]). Sample sizes differ slightly due to the lack of sufficient time series data of returns to measure β for some firms. Z-statistics for the market-adjusted returns are constructed using standardized prediction errors as in Dodd and Warner (1983) and Mikkelson and Partch (1985). *, **, and *** denote significance at the 10%, 5%, and 1% levels (for a two-sided test), respectively.

	2-Day (β-adjusted) CAR [0, 1]			2-Day (excess of market) CAR [0, 1]		
	Number of firms	Mean return	Z-statistics	Number of firms	Mean return	T-statistics
All firms	168	0.0118	2.34**	170	0.0105	2.12**
Venture-backed firms	122	0.0170	3.38***	124	0.0159	2.69**
Non–venture-backed firms	46	−0.0022	−0.58	48	−0.0032	−0.37
T-statistics for differences			1.74*			1.81*
F-test from one-way ANOVA			2.93*			2.78*

5% level. The mean 2-day excess return for the venture-backed sample is a positive 1.59% and is significant at the 5% level. The mean 2-day excess return for the non–venture-backed sample is a negative −0.32% and is not significantly different from zero.

I formally test the hypothesis that the cumulative abnormal returns are the same in the venture- and non–venture-backed subsamples. Both the F-test from an unbalanced analysis of variance (ANOVA) and the t-test for differences in means reject the null hypothesis at the 10% level. I repeat these tests using the 2-day excess returns; again, both tests reject the null hypothesis of equal mean returns at the 10% level.

As a robustness check, I proceed to analyze the 2-day β-adjusted and excess-of-market CARs in a regression framework. Since the market for corporate control underwent changes over the course of the sample period, I include an indicator for the year of adoption. I further control for firm size and the number of months that pass from IPO to adoption of the rights agreement. The independent variable of interest is VC, the indicator variable for venture backing. The results of the estimations are presented in Table V. The loading on venture backing, similar in both formulations, is approximately 2.1% and is significant at the 10% level. This estimate is slightly higher than the raw difference of 1.9% in β-adjusted CAR and 1.8% in excess-of-market CAR between venture- and non–venture-backed firms. The estimate grows larger under the treatment framework and remains significant. As in the previous section, the correlation coefficient in the treatment model is statistically significant

Table V. Wealth effect at adoption of shareholder rights agreement—regression analysis

This table presents the estimates of regression analysis of the wealth effect of the adoption of SRAs (poison pill) by IPO firms, within 3 years of IPO. I include only the first time a rights agreement is adopted (and not subsequent amendments). The dependent variable in the first set of tests is the 2-day β-adjusted CAR (measured as the return on the announcement day and the day following [0, 1]). The dependent variable in the second set of tests is the 2-day excess-of-market CAR (measured as the return on the announcement day and the day following [0, 1]). The independent variables are an indicator variable taking the value 1 if the firm is venture backed and 0 otherwise, the length of time between firm IPO and the adoption date, measured in months, and the log of the firm market capitalization. The first column in each set presents the estimates from fixed effects regressions. The second column presents estimates of a treatment model that controls for the endogeneity of venture backing. The independent variables in the selection equation of the treatment model are the dollar amount invested by the VC industry in the firm's headquarters state in the year of founding (as proxied for by the year 7 years prior to IPO) in millions of dollars and industry indicator variables. Since the VC investment amounts are not available prior to 1980, the 1980 data are used for all firms whose founding year proxy is prior to 1980, and an indicator variable taking the value 1 if the firm founding year proxy is prior to 1980 and 0 otherwise, is also included. Standard errors are heteroskedastic consistent as per White (1980). The coefficients on the indicators for adoption year and industry are not reported here for the sake of brevity. *, **, and *** denote significance at the 10%, 5%, and 1% levels (for a two-sided test), respectively.

	2-Day (β-adjusted) CAR [0, 1]				2-Day (excess of market) CAR [0, 1]			
	Robust OLS		Treatment		Robust OLS		Treatment	
Variable	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
Venture backing	0.0211	1.78*	0.0693	3.46***	0.0206	1.75*	0.0673	3.22***
Months from IPO	0.0002	0.71	0.0002	0.73	0.0002	1.00	0.0002	0.83
Log size	−0.0002	0.05	0.0004	0.10	0.0005	0.15	0.0010	0.25
Year of adoption fixed effects	Included		Included		Included		Included	
Correlation between test and treatment model errors, ρ				−0.5270				−0.5097
Wald test of $\rho = 0$ (independent equations), χ^2				6.12**				5.09**
Number of observations	168		162		170		164	
Treatment model								
Amount invested by VC industry in firm headquarters state in founding year			1.20×10^{-7}	3.38***			1.17×10^{-7}	3.32***
Founded before 1980			0.2231	0.66			0.2202	0.65
Industry indicators			Included				Included	

and is of opposite sign to that which would have been expected if the observed effect was due to the naive selection story rather than to an effect of venture backing.

From the above analysis, it appears that the market reacts more favorably to the adoption of SRAs by venture-backed firms than by non–venture-backed firms. This is consistent with the hypothesis that the venture-backed firms are perceived as being more likely to use the rights agreement to maximize shareholder wealth than are non–venture-backed firms. Note that this is a particularly strong test of the market's perception of firm governance, since presumably *ex ante*, the market price of a firm already incorporates a probability of adoption of an SRA and the associated value impact (positive or negative). If this assigned probability of adoption is higher for venture-backed firms, as it would appear to be from the relative adoption rates in the data and if the associated value impact of such an adoption for venture-backed firms is higher than for non–venture-backed firms, as hypothesized, then the impact on share price of the announcement of the adoption by a venture-backed firm will be reduced, as it has already been partly incorporated in the share price. This would then bias against the observation of a significant difference between the two groups of firms in event returns around the ultimate adoption date.

Both the results from the previous section, which examine a symptom of weak governance, and from the analysis in this section, which examines the market's perception of governance, are consistent with the hypothesis that venture-financed firms are more likely to be better governed than are similar non–venture-backed firms. I now proceed to look directly at a set of observable governance structures of the firm, namely the board of directors and its committees.

5. The Board of Directors and Its Characteristics

Boards of directors are a crucial part of the corporate structure. The law imposes on the board a strict and fiduciary duty to ensure that the company is run in the long-term interests of the shareholders. Formal economic theory on boards is limited; however, a number of regularities have been established by the empirical literature. Board actions do appear to be related to board structures; firms whose board structures are more independent from management tend to make better decisions. Not surprisingly, shareholder advocates and business groups have long been proponents of independent board structures.

5.1 BOARD COMPOSITION

Most directors can be classified either as inside or outside directors. Outside directors are not employees of the firm nor do they have substantial business ties with the

firm or its management. Their incentives are not aligned with those of the CEO or top management, and it is these directors who lend the board a degree of independence. Inside directors are generally directors who are employees or former employees of the firm. Insiders are not considered to be independent of the CEO or management. Usually, their success is tied to the CEO. Some directors fall into neither of the above categories. These directors, who are referred to as grey directors, are those directors who have substantial business ties to the firm or provide it with banking, consulting, or legal services.

Presumably, if outsiders command a powerful majority in the boardroom, they will be better able to hold in check management's tendencies to abuse power (Monks and Minow, 2001). Fama (1980) and Fama and Jensen (1983) argue that outside directors bear a reputation cost if performance is poor, leading them to monitor management actions more carefully compared to other directors. Consistent with this argument, empirical studies have shown that firms with outsider-dominated boards are more likely to undergo major restructuring events such as takeovers, mergers, and tender offers (Lin, 1996) and are more likely to nominate outside CEOs (Borokhovich, Parrino, and Trapani, 1996). Shareholder wealth increases with the addition of outsiders to the board (Rosenstein and Wyatt, 1990), and outside directors enhance shareholder wealth during tender offers (Cotter, Shivdasani, and Zenner, 1997).

A firm with an outside director majority is more likely to replace a CEO following poor firm performance (Weisbach, 1988), make better acquisitions (Byrd and Hickman, 1992), and adopt poison pills to improve shareholder value rather than impede value-creating takeovers (Brickley, Coles, and Terry, 1994). Last but not least, Richardson (2006) finds less overinvestment of surplus cash for firms with more independent boards.[26]

As can be seen from the summary statistics in Panel B of Table I, the average board of directors in the subsample is composed of 53.3% outsiders, 42.1% insiders, and 4.5% grey directors.[27] For venture-backed firms, the percentage of outsiders is 65.1% and the percentage of insiders is 32%. For non–venture-backed firms, the percentage of insiders, 50.9%, is higher than the sample average and the percentage of outsiders, 42.9%, is lower.

I analyze the proportions of insider and outsider representation in a regression framework. Since I wish to analyze proportion variables, which are bounded between zero and one, I use the standard logit transformation ln $(x/(1 - x))$ for

[26] While there is much evidence that boards with a majority of outside directors are more likely to make decisions that benefit shareholders, the evidence connecting board composition to performance is mixed. Hermalin and Weisbach (1991) find no relation, while Baysinger and Butler (1985) find some evidence that firms perform better if boards include more outsiders.

[27] The percentages do not add up to precisely 100% due to rounding.

proportions, where x is either the proportion of insiders or outsiders on the board. I estimate the model:

$$\begin{aligned}\mathrm{LPCTO}_i = {} & \beta_0 + \beta_{\mathrm{sz}}\mathrm{SZ}_i + \beta_{\mathrm{vc}}\mathrm{VC}_i + \beta_{\mathrm{rep}}\mathrm{VCREPX}_i + \beta_{\mathrm{vct}}\mathrm{VCTENUREX}_i \\ & + \beta_{\mathrm{lst}}\mathrm{LSTENUREX}_i + \beta_{\mathrm{age}}\mathrm{CEOAGE}_i + \beta_{\mathrm{fn}}\mathrm{FOUNDER}_i \\ & + \beta_{\mathrm{tn}}\mathrm{CEOTENURE}_i + \beta_{\mathrm{rt}}\mathrm{RETIRE}_i + \beta_{\mathrm{de}}\mathrm{DEIND}_i + \Gamma'\boldsymbol{IND}_i \\ & + \epsilon_i, \end{aligned} \tag{4}$$

where LPCTO is the logit transform for the proportion of outsiders on the board, the control variables are SZ, the log of the market capitalization of the firm on the first day of listing on CRSP, ***IND*** are industry dummies (based on one-digit SIC codes), VC, an indicator variable taking the value 1 if the firm is venture backed and 0 otherwise, and VC, firm and CEO characteristics, as follows.

VCREPX proxies for the experience of the VCs for venture-backed firms. VCREPX takes the value 0 for non–venture-backed firms, and for venture-backed firms, it equals the number of funds (from venture firm inception to year of the IPO) raised by the venture capital firm that has been involved longest with the IPO firm.[28] VCTENUREX is an interaction between the log of the number of years a VC has been on the board of directors of the firm and VC. LSTENUREX is an interaction between the log of the number of years a large shareholder of some sort has been present on the board and an indicator variable taking the value 1 if a there is a non-VC large shareholder with board representation and 0 otherwise. The experience and tenure variables control for the relative power of outside shareholders, as Hermalin and Weisbach (1998) predict that outsider representation on the board increases with the power of outside investors. CEOAGE is the log of the CEO's age, in years. FOUNDER is an indicator variable taking the value 1 if the CEO is also a founder of the firm and 0 otherwise. CEOTENURE is the log of the number of years the CEO has served in that position. These three variables control for the relative power of the CEO, consistent with the prediction of Hermalin and Weisbach (1998) that outsider representation on the board decreases with the power of the CEO. RETIRE is an indicator variable taking the value 1 if the CEO is near retirement age (>62) and 0 otherwise. If the CEO is nearing retirement, the firm might bring additional insiders onto the board to train for the CEO role. Finally, DEIND is an indicator variable taking the value 1 if the firm is incorporated in the

[28] The reported results are robust to alternative proxies for VC experience including age of the VC firm and the number of firms it has brought to IPO. The results also remain qualitatively similar if I employ the experience proxies for the most experienced VC firm with a board position or the average for all VCs on the board.

state of Delaware. Delaware has a unique legal regime among the states and a well-developed chancery court with set precedents for dealing with firm agency issues (Daines, 2001), which may substitute for other governance mechanisms. Industry and firm size are included as controls since the ability of the firm to attract outside directors may vary with these characteristics.

The first column of Table VI presents the estimates of the coefficients in Equation (4). The coefficient on VC is 1.64 and is significant at the 1% level. Holding all other variables at their mean, this corresponds to an outsider proportion of 0.67 of the board of directors for venture-backed firms versus a proportion of 0.28 of the board for non–venture-backed firms. I estimate a similar model for LPCTI, the logit transform for the proportion of insiders on the board.[29] The third column of the table presents the results of the estimation. Here, the coefficient on VC is −1.42 and is significant at the 1% level. Holding all other variables at their mean, this corresponds to an insider proportion of 0.29 of the board of directors for venture-backed firms versus a proportion of 0.63 of the board for non–venture-backed firms.

The coefficients on the control variables in both equations are generally as expected. The proportion of outsiders (insiders) decreases (increases) with the age of the CEO and when the CEO is a founder of the firm (although the coefficients are not significant), consistent with the predictions of Hermalin and Weisbach (1998). The coefficient on CEO tenure is not statistically significant in either specification. Additionally, while the length of time that a VC has been present on the board is not statistically significantly different from zero, the coefficient on the board tenure of non-VC large shareholders is positive (negative) and significant in the analysis of the proportion of outsiders (insiders) on the board. This, too, is consistent with the predictions of Hermalin and Weisbach (1998).

The second and fourth columns of the table present the estimates of the models for LPCTO and LPCTI under the treatment model framework. As can be seen from the treatment model estimates in the table, the correlation coefficient estimates are opposite in sign from that which would be expected if the firms that receive venture backing are those that are more likely, regardless, to have more independent board compositions. This is consistent with the findings on the direction of the selection bias in Section 3. For both models, I cannot reject the null hypothesis of zero correlation between the first- and second-stage equations. The coefficients on venture backing remain significant and similar to those obtained without accounting for the selection, as do the corresponding marginal effects.

To further examine board composition, I follow Weisbach (1988) and Cotter, Shivdasani, and Zenner (1997) and classify the sample into three categories: firms

[29] After subtracting from one the proportion of insiders and the proportion of outsiders, the remainder is the proportion of grey directors on the board.

Table VI. Board composition

This table presents the results of analysis of board-of-director composition. The dependent variable in the first set of tests is the proportion of outsider members. The dependent variable in the second set of tests is the proportion of insider members. The difference between the two is the proportion of grey directors. In each set of tests, the first test is a probit analysis and the second applies a treatment model to the probit to control for the endogeneity of venture backing. The control variables for all tests are the log of firm size (market capitalization) at the time of IPO, VC reputation/experience, proxied for by the number of venture funds raised by the VC who has had board representation the longest, the log of the number of years a VC has been present on the board of directors (interacted with an indicator for venture backing), the log of the number of years any large shareholder has been present on the board of directors (interacted with an indicator variable for a non-VC large shareholder), the log of CEO age (in years), the log of CEO tenure (in years), an indicator variable taking the value 1 if the CEO is near retirement age (62 years and older) and 0 otherwise, an indicator variable taking the value 1 if the firm is incorporated in Delaware and 0 otherwise, and indicator variables for industry affiliation (based on one-digit SIC codes), the coefficients on which are omitted for the sake of brevity. The independent variables in the selection equation of the treatment model are the dollar amount invested by the VC industry in the firm's headquarters state in the year of founding in millions of dollars and industry indicator variables. As the VC investment amounts are not available prior to 1980, the 1980 data are used for all firms whose founding year is prior to 1980, and an indicator variable taking the value 1 if the firm founding year is prior to 1980 and 0 otherwise, is also included. All tests use White (1980) heteroskedasticity-consistent robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels (for a two-sided test), respectively.

	Logit transform for proportion of outsiders				Logit transform for proportion of insiders			
	Robust OLS		Treatment model		Robust OLS		Treatment model	
	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
Intercept	5.1909	1.19	4.7862	1.14	−4.3497	−1.10	−4.2981	−1.08
Log size	0.3988	2.01**	0.4023	2.10**	−0.3270	−1.72 *	−0.3274	−1.78*
Venture capital backing	1.6379	3.56***	1.9570	2.18**	−1.4168	−3.23***	−1.4574	−1.65*
VC reputation/experience	−0.0229	−1.06	−0.0250	−1.19	0.0276	1.33	0.0279	1.37
Log VC board tenure	0.0544	0.37	0.0497	0.35	−0.0154	−0.11	−0.0148	−0.11
Log large shareholder board tenure	0.8610	2.56**	0.8600	2.65**	−0.6423	−1.85*	−0.6421	−1.92*
Log CEO age	−1.7913	−1.49	−1.7290	−1.50	1.3346	1.21	1.3267	1.23
CEO is founder	−0.1855	−0.51	−0.1856	−0.53	0.0922	0.28	0.0922	0.29
Log CEO tenure	0.0567	0.47	0.0590	0.50	−0.0577	−0.48	−0.0580	−0.48
CEO is near retirement	−0.2854	−0.25	−0.2761	−0.25	0.5962	0.53	0.5949	0.54

Continued

Table VI. (Continued)

	Logit transform for proportion of outsiders				Logit transform for proportion of insiders			
	Robust OLS		Treatment model		Robust OLS		Treatment model	
	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
Delaware incorporation	0.3276	0.85	0.3252	0.87	−0.1772	−0.48	−0.1769	−0.50
Industry indicator variables	Included		Included		Included		Included	
Correlation between test and treatment model errors, ρ			−0.0768				0.1017	
Wald test of $\rho = 0$ (independent equations), χ^2			0.19				0.00	
Number of observations	232		232		232		232	
Treatment model								
Amount invested by VC industry in firm headquarters state in founding year			4.93×10^{-8}	2.30**			4.92×10^{-8}	2.25**
Founded before 1980			−0.5691	−2.55**			−0.5679	−2.53**
Industry indicators			Included				Included	

with an outsider-dominated board (i.e., outsiders constitute more than 60% of the board), firms with an insider-dominated board (insiders constitute more than 60% of the board), and firms with a mixed board (all others). Only 6.4% of venture-backed firms have insider-dominated boards versus 15.3% of non–venture-backed firms. 58.7% of venture-backed firm and 37.1% of non–venture-backed firms have outsider-dominated boards.

I define two binary variables, OUTDOM and INDOM, which take the value 1 if the firm has an outsider-dominated board or insider-dominated board, respectively, and 0 otherwise. I then examine these variables in a probit framework, with controls as in Equation (4), as well as under the bivariate probit selection framework. The results of these estimations are presented in Table VII. In the analysis of OUTDOM, the loading on VC is positive and highly significant. Holding all other variables at their mean, the coefficient of 1.32 corresponds to an additional 0.49 probability that the firm has an outsider-dominated board for venture-backed firms relative to non–venture-backed firms. The coefficient and the marginal effect remain similar under the treatment model, though the coefficient loses significance. The correlation coefficient is small and not statistically significant. In the analysis of INDOM, the loading on VC is negative, −1.15, and significant at the 1% level, corresponding to a reduction of 0.16 in the probability of having an insider-dominated board for venture-backed firms relative to non–venture-backed firms. Under the treatment model, the coefficient grows to −1.85 and remains significant. Once again, I cannot reject the null hypothesis of zero correlation between the selection and test model errors.

The results of the above analyses are consistent with the hypothesis that venture-backed firms have more independent boards than do non–venture-backed firms. However, boards function through their committees and a more complete picture can be drawn by also examining the composition of these important board substructures.

5.2 BOARD COMMITTEES

The board of directors typically has a number of committees that are charged with particular duties. In particular, the American Bar Association's (1994) *Corporate Director's Guidebook* and the Committee on Corporate Laws (1979) emphasize that directors carry out their oversight duties in board committees. The relative representation of outsiders on these committees is another potential measure of the management/shareholder power balance, with the logic similar to that regarding the composition of the board itself. The major committees involved in the governance of the firm are the audit, compensation, and nominating committees.

Audit committees interact with management, the board, and the external auditor and conduct inquiries into management judgments, accounting estimates, audit

Table VII. Board independence

This table presents the results of probit analysis of the probabilities of various board-of-director composition structures. The dependent variable in the first set of tests is an indicator variable taking the value 1 if the board is independent (i.e., the proportion of outsider members is greater than 0.5) and 0 otherwise. The dependent variable in the second set of tests is an indicator variable taking the value 1 if the board is outsider dominated (i.e., the proportion of outsider members is greater than 0.6) and 0 otherwise. The dependent variable in the third set of tests is an indicator variable taking the value 1 if the board is insider dominated (i.e., the proportion of insider members is greater than 0.6) and 0 otherwise. In each set of tests, the first test is a probit analysis and the second applies a treatment model to the probit to control for the endogeneity of venture backing. The control variables for all tests are the log of firm size (market capitalization) at the time of IPO, VC reputation/experience, proxied for by the number of venture funds raised by the VC who has had board representation the longest, the log of the number of years a VC has been present on the board of directors (interacted with an indicator for venture backing), the log of the number of years any large shareholder has been present on the board of directors (interacted with an indicator variable for a non-VC large shareholder), the log of CEO age (in years), the log of CEO tenure (in years), an indicator variable taking the value 1 if the CEO is near retirement age (62 years and older) and 0 otherwise, an indicator variable taking the value 1 if the firm is incorporated in Delaware and 0 otherwise, and indicator variables for industry affiliation (based on one-digit SIC codes), the coefficients on which are omitted for the sake of brevity. The independent variables in the selection equation of the treatment model are the dollar amount invested by the VC industry in the firm's headquarters state in the year of founding in millions of dollars and industry indicator variables. As the VC investment amounts are not available prior to 1980, the 1980 data are used for all firms whose founding year is prior to 1980, and an indicator variable taking the value 1 if the firm founding year is prior to 1980 and 0 otherwise, is also included. All tests use White (1980) heteroskedasticity-consistent robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels (for a two-sided test), respectively.

	Outsider-dominated				Insider-dominated			
	Probit		Treatment model		Probit		Treatment model	
	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics
Intercept	−1.1132	−0.41	−0.7857	−0.27	4.1649	1.48	4.8076	1.85*
Log size	0.2066	1.96**	0.2032	1.90*	−0.0926	−0.85	−0.1000	−0.98
Venture capital backing	1.3204	4.71***	1.0581	1.08	−1.1556	−3.32**	−1.8497	−1.72*
VC reputation/experience	−0.0048	−0.19	−0.0030	−0.12	−0.0528	−1.19	−0.0479	−1.01
Log VC board tenure	−0.0419	−0.26	−0.0379	−0.24	0.1331	0.64	0.1384	0.71
Log large shareholder board tenure	0.3557	1.52	0.3522	1.51	−0.2141	−0.80	−0.2010	−0.79
Log CEO age	−0.1680	−0.24	−0.2153	−0.30	−1.2405	−1.65*	−1.2798	−1.73*
CEO is founder	−0.3807	−1.85*	−0.3795	−1.84*	−0.0864	−0.39	−0.0672	−0.30

Continued

Table VII. (Continued)

	Outsider-dominated				Insider-dominated			
	Probit		Treatment model		Probit		Treatment model	
	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics
Log CEO tenure	0.0327	0.61	0.0305	0.56	0.0679	1.30	0.0588	1.01
CEO is near retirement	−0.2524	−0.59	−0.2616	−0.62	1.0147	2.51**	0.9162	1.72*
Delaware incorporation	0.3766	1.93*	0.3729	1.91*	0.1072	0.54	0.1069	0.55
Industry indicator variables	Included		Included		Included		Included	
Correlation between test and treatment model errors, ρ			0.1602				0.4985	
Wald test of $\rho = 0$ (independent equations), χ^2			0.08				0.21	
Number of observations	232		232		232		232	
Treatment model								
Amount Invested by VC industry in firm headquarters state in founding year			5.15×10^{-8}	2.13**			4.39×10^{-8}	1.58
Founded before 1980			−0.5442	−1.99**			−0.6003	−2.78***
Industry indicators			Included				Included	

adjustments, and transactions between the firm and its officers or employees. The audit committee's roles include preventing fraudulent accounting statements, as well as brokering disputes between management and outside auditors on how to apply GAAP. Independent audit committees are expected to be more efficient and objective monitors of the financial accounting process. Compensation committees determine and review compensation packages for top management. An independent compensation committee implies greater accountability and a greater chance that management compensation packages are being optimized to properly align management interests with those of the shareholders. Nominating committees nominate candidates for senior management positions as well as for election to the board of directors. During the time period covered by the sample, the rules for committee composition were vague at best. Large US companies were encouraged, and in some cases required, to maintain audit committees comprised a majority of, or solely of, "independent" members, although no definition of independence was provided in stock exchange listing requirements.

I examine two measures of committee independence from management. For each committee, I classify the committee composition by two methods: (i) whether the committee is free of insider members (i.e., is composed solely of outsider and grey directors) and (ii) whether the committee is composed entirely of outsiders.[30] Seventy-seven percent of venture-backed firms have fully independent (only outsider members) audit committees, and 83.5% of venture-backed firms have audit committees with no insider members. By comparison, only 32.3% of non–venture-backed firms have fully independent audit committees, and only 42.7% have audit committees with no insider representation. A similar picture emerges for compensation committees, with 69.7% of venture-backed firm compensation committees fully independent of management and 77.1% free of insider members; for the non–venture-backed firms, the percentages are 26.6% and 37.1%, respectively. Interestingly, in the sample of newly public firms, nearly all the firms stated in their prospectus that the entirety of the board serves as the nominating committee for the firm. Thus, I do not analyze nominating committee composition separately.

Panel A of Table VIII presents the results from probit analysis of the dependent variables ACNOIN, an indicator variable taking the value 1 if the audit committee has no insider members, and ACALLO, an indicator variable taking the value 1 if the audit committee is composed entirely of outsiders. For both dependent variables, the loading on VC is positive, corresponding to an increase of 0.10 in the

[30] For firms where separate audit and compensation committees have not been established, the prospectus will generally note that the board serves as the committee in question. I therefore use board composition in lieu of committee composition for these firms. There are 21 such firms in the sample, 9 venture backed and 12 non-venture backed. The results of the analysis that follows remain similar if these firms are omitted.

Table VIII. Audit and compensation committee composition

This table presents the results of probit analysis of the probabilities of various board-of-director committee composition structures. Panel A examines the composition of the audit committee, and Panel B examines the composition of the compensation committee. For both panels, the dependent variable in the first set of tests is an indicator variable taking the value 1 if the committee has no insider members and 0 otherwise. The dependent variable in the second set of tests is an indicator variable taking the value 1 if the committee has only outsider members and 0 otherwise. In each set of tests, the first test is a probit analysis and the second applies a treatment model to the probit to control for the endogeneity of venture backing. The control variables for all tests are the log of firm size (market capitalization) at the time of IPO, VC reputation/experience, proxied for by the number of venture funds raised by the VC who has had board representation the longest, the log of the number of years a VC has been present on the board of directors (interacted with an indicator for venture backing), the log of the number of years any large shareholder has been present on the board of directors (interacted with an indicator variable for a non-VC large shareholder), the log of CEO age (in years), the log of CEO tenure (in years), an indicator variable taking the value 1 if the CEO is near retirement age (62 years and older) and 0 otherwise, an indicator variable taking the value 1 if the firm is incorporated in Delaware and 0 otherwise, and indicator variables for industry affiliation (based on one-digit SIC codes), the coefficients on which are omitted for the sake of brevity. The independent variables in the selection equation of the treatment model are the dollar amount invested by the VC industry in the firm's headquarters state in the year of founding in millions of dollars and industry indicator variables. As the VC investment amounts are not available prior to 1980, the 1980 data are used for all firms whose founding year is prior to 1980, and an indicator variable taking the value 1 if the firm founding year is prior to 1980 and 0 otherwise, is also included. All tests use White (1980) heteroskedasticity-consistent robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels (for a two-sided test), respectively.

	No insiders				All outsiders			
	Probit		Treatment model		Probit		Treatment model	
	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics
Panel A: audit committee								
Intercept	−0.4985	−0.19	−0.7748	−0.29	0.1031	0.04	−0.1019	−0.04
Log size	0.1594	1.66*	0.1609	1.71*	0.1613	1.68*	0.1623	1.70*
Venture capital backing	0.6568	2.27**	1.0395	1.40	0.4475	1.58	0.7153	0.58
VC reputation/experience	0.1808	2.64***	0.1769	2.52**	0.2561	3.08***	0.2537	2.92***
Log VC board tenure	0.0835	0.43	0.0701	0.37	0.2072	1.08	0.1968	1.02
Log large shareholder board tenure	0.1569	0.61	0.1515	0.59	0.1625	0.65	0.1604	0.64
Log CEO age	0.1566	0.23	0.2255	0.33	−0.0008	−0.00	0.0506	0.07

Continued

Table VIII. (Continued)

	No insiders				All outsiders			
	Probit		Treatment model		Probit		Treatment model	
	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics
CEO is founder	0.0216	0.11	0.0195	0.10	−0.0383	−0.18	−0.0386	−0.19
Log CEO tenure	−0.0857	−1.76*	−0.0817	−1.65*	−0.0559	−1.13	−0.0537	−1.06
CEO is near retirement	−0.2693	−0.71	−0.2520	−0.67	−0.4390	−1.07	−0.4255	−1.02
Delaware incorporation	−0.1372	−0.71	−0.1389	−0.73	−0.2487	−1.27	−0.2492	−1.29
Industry indicator variables	Included		Included		Included		Included	
Correlation between test and treatment model errors, ρ				−0.2465				−0.1699
Wald Test of $\rho = 0$ (Independent Equations), χ^2				0.25				0.05
Number of observations	232		232		232		232	
Treatment model								
Amount invested by VC industry in firm headquarters state in founding year			4.93×10^{-8}	2.35**			5.03×10^{-8}	1.96**
Founded before 1980			−0.5522	−2.37**			−0.5392	−1.83*
Industry indicators			Included				Included	
Panel B: compensation committee								
Intercept	0.6273	0.25	0.1409	0.06	−0.1999	−0.08	−0.8346	−0.35
Log size	0.1959	2.14**	0.1865	2.17**	0.1964	2.12**	0.1792	1.97**
Venture capital backing	0.7539	2.84***	1.5199	1.65*	0.6453	2.45**	1.5682	1.77*
VC reputation/experience	0.0082	0.26	0.0027	0.08	0.0143	0.46	0.0066	0.22
Log VC board tenure	0.3417	1.94*	0.3008	1.71*	0.4536	2.64***	0.3794	1.84*
Log large shareholder board tenure	0.1150	0.46	0.1040	0.46	0.0938	0.39	0.0848	0.41
Log CEO age	−0.2316	−0.36	−0.0945	−0.16	−0.3886	−0.60	−0.1994	−0.33
CEO is founder	−0.2157	−1.12	0.2079	−1.17	−0.2127	−1.08	−0.1977	−1.11
Log CEO tenure	−0.0095	−0.22	−0.0027	−0.07	0.0289	0.67	0.0337	0.88
CEO is near retirement	0.1417	0.37	0.1604	0.46	−0.0601	−0.15	−0.0080	−0.02
Delaware incorporation	0.0961	0.53	0.0796	0.46	0.0242	0.13	0.0099	0.06
Industry indicator variables	Included		Included		Included		Included	

Continued

Table VIII. (Continued)

	No insiders				All outsiders			
	Probit		Treatment model		Probit		Treatment model	
	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics	Coefficient	Z-statistics
Correlation between test and treatment model errors, ρ				−0.5242				−0.6313
Wald test of $\rho = 0$ (independent equations), χ^2				0.38				0.48
Number of observations	232		232		232		232	
Treatment model								
Amount invested by VC industry in firm headquarters state in founding year			5.53×10^{-8}	2.56***			5.79×10^{-8}	2.75***
Founded before 1980			−0.4647	−1.40			−0.4357	−1.37
Industry indicators			Included				Included	

probability that a firm has no insiders on its audit committee and of 0.06 in the probability that a firm has only outsiders on its audit committee for venture-backed firms relative to non–venture-backed firms. However, only in the analysis for ACALLO is the coefficient on VC significant.

Under the treatment model framework, the estimated coefficients on VC in both models grow 40%–50%, but neither retains significance. In this case, however, the coefficient on VCREPX, the variable taking the value of the VC experience proxy for venture-backed firms and the value 0 for non–venture-backed firms, is positive and statistically and economically significant in both models and remains so under the treatment framework. This result suggests that venture-backed firms do have more independent audit committees and that the effect is stronger the greater the experience of the VC firm.

Panel B of the table presents the results from probit analysis of the dependent variables CCNOIN, an indicator variable taking the value 1 if the compensation committee has no insider members and 0 otherwise, and CCALLO, an indicator variable taking the value 1 if the compensation committee is composed entirely of outsiders. For both variables, the loading on VC is positive and significant at the 5% level, corresponding to an increase of 0.16 in the probability that a firm has no insiders on its compensation committee and of 0.23 in the probability that a firm has only outsiders on its compensation committee for venture-backed firms relative to non–venture-backed firms. Under the treatment framework, the estimated coefficient on VC in the model for CCNOIN doubles, from 0.75 without the treatment correction to 1.51 with the treatment correction. The estimated coefficient on VC in the model for CCALLO grows from 0.65 to 1.56. In both models, the coefficient estimates remain statistically significant after accounting for the possible selection bias.

It appears from the above analysis that not only do venture-backed firms have more independent boards but that even despite the lack of guidelines and exchange requirements for independent committees during the sample period, venture-backed firms are still more likely than non–venture-backed firms to have committees that are free of management influence and conflicts of interest.

5.3 CEO/CHAIRMAN DUALITY

Last but not least, I examine the separation of the roles of chairman of the board and CEO. Jensen (1993) argues that directors are more likely to acquiesce to the CEO's desires when the CEO is also the chairman of the board. Separation of the roles of chairman and CEO, therefore, should lead to a more objective evaluation of the CEO and management and greater accountability. Empirical evidence is consistent with this hypothesis. Rechner and Dalton (1991) find that companies with a separate CEO and chairman consistently outperform those companies that combine the roles. Yermack (1996) finds that firms are valued more highly when the CEO and chairman

Table IX. Board chairmanship duality

This table presents the results of probit analysis of the probability of the chairmanship of the board being held by the firm CEO. The dependent variable is an indicator variable taking the value 1 is the CEO serves as chair and 0 otherwise. The control variables for all tests are the log of firm size (market capitalization) at the time of IPO, VC reputation/experience, proxied for by the number of venture funds raised by the VC who has had board representation the longest, the log of the number of years a VC has been present on the board of directors (interacted with an indicator for venture backing), the log of the number of years any large shareholder has been present on the board of directors (interacted with an indicator variable for a non-VC large shareholder), the log of CEO age (in years), the log of CEO tenure (in years), an indicator variable taking the value 1 if the CEO is near retirement age (62 years and older) and 0 otherwise, an indicator variable taking the value 1 if the firm is incorporated in Delaware and 0 otherwise, and indicator variables for industry affiliation (based on one-digit SIC codes), the coefficients on which are omitted for the sake of brevity. The independent variables in the selection equation of the treatment model are the dollar amount invested by the VC industry in the firm's headquarters state in the year of founding in millions of dollars and industry indicator variables. As the VC investment amounts are not available prior to 1980, the 1980 data are used for all firms whose founding year is prior to 1980, and an indicator variable taking the value 1 if the firm founding year is prior to 1980 and 0 otherwise, is also included. All tests use White (1980) heteroskedasticity-consistent robust standard errors. *, **, and ***denote significance at the 10%, 5%, and 1% levels (for a two-sided test), respectively.

Chairmanship of the board				
	Probit		Treatment model	
	Coefficient	Z-statistics	Coefficient	Z-statistics
Intercept	−6.1068	2.13**	−5.6031	−1.86*
Log size	−0.1888	−1.78*	−0.1908	−1.84*
Venture capital backing	−0.9880	−3.35***	−1.3779	−2.23**
VC reputation/experience	0.0286	1.00	0.0309	1.09
Log VC board tenure	−0.0994	−0.56	−0.0951	−0.54
Log large shareholder board tenure	−0.3616	−1.53	−0.3544	−1.53
Log CEO age	1.8400	2.49**	1.7408	2.27**
CEO is founder	0.9095	3.73***	0.8962	3.59***
Log CEO tenure	0.1103	1.92*	0.1061	1.88*
Delaware incorporation	−0.3990	−0.80	−0.4131	−0.84
CEO is near retirement	−0.3529	−1.68*	−0.3529	−1.69**
Industry indicator variables	Included		Included	
Correlation between test and treatment model errors, ρ			0.2584	
Wald Test of $\rho = 0$ (Independent Equations), χ^2			0.37	
Number of observations	208		208	
Treatment model				
Amount invested by VC industry in firm headquarters state in founding year			3.66×10^{-8}	1.64
Founded before 1980			−0.7182	−3.09***
Industry indicators			Included	

positions are separated. Field and Karpoff (2002) find that firms with a joint CEO/chairman are more likely to employ anti-takeover defenses at the time of IPO.

The CEO serves as chairman of the board in 72.7% of the non–venture-backed firms in the sample. In venture-backed firms, however, dual CEO/chairmen appear only 46.5% of the time. Table IX presents the results of probit analysis of CCHAIR, an indicator variable taking the value 1 if the position of chairman of the board is filled by the CEO. Twenty-four of the firms in the sample do not indicate in their prospectus who serves as chairman of the board. These firms are not included in the analysis. The independent variables are those included in the previous models of board characteristics. The coefficient on VC is −0.988 and is significant at the 1% level, corresponding to a reduction of 0.37 in the probability that the CEO serves as the chairman of the board for a venture-backed firm relative to a non–venture-backed firm, when all other variables are held at their means. The coefficient grows slightly to −1.38 under the treatment model, corresponding to a reduction of 0.45 in the probability that the CEO serves as the chairman and remains significant at the 5% level.

The collection of above results are consistent with the argument that venture-backed firms have more independent board structures than non–venture-backed firms, even accounting for the possible selection bias. Venture-backed firm boards have a lower proportion of insiders and a higher proportion of outsiders. They are also less likely to be insider dominated. Both the audit and compensation committees of venture-backed firms are more likely to be free of insider representation and to consist solely of outsider members. Furthermore, venture-backed firms are more likely to separate the roles of CEO and chairman. An interesting feature is that for all but one of the models estimated, the correlation coefficient estimate in the treatment model suggests that if selection is taking place, it is such that the firms that receive venture capital are those who would be less likely to set good board structures *ex ante*.

6. Venture Capital Effect or Large Shareholder Effect?

An interesting question that remains is whether the effects documented above are an effect specific to VC stakeholders or whether they are merely a large shareholder effect resulting from the involvement of any outside entity in the pre-IPO firm. There are a number of reasons why we may expect to see a different effect depending on the type of investor funding the firm in the pre-IPO stage. One possibility is that the VC possesses specific skills that other large shareholders do not. For example, it might be the case that the VC is more effective at exercising control in the companies that he finances. Second, it is possible that rather than possessing skills that other shareholders lack, the VC might simply be more aware of the problems and issues that need to be addressed, owing to accumulated experience with startup firms and the IPO process.

VCs might also have stronger effects on governance than other large shareholders have indirectly, through their efforts to professionalize the firm. While some governance effects may be related merely to the presence of a large shareholder, others may require more active involvement in the affairs of the firm. If other types of pre-IPO large shareholders are less actively involved in the firm and its governance, we might see a difference between venture-backed firms and those firms that have some other form of pre-IPO large shareholder. For example, we may expect to find greater effects for VC than for angel investors due to the greater involvement of the VC in the portfolio firm.[31]

Another reason we may see expects a difference in the level of involvement of the large shareholder in the governance of the firm is differences in incentives for the VC and other types of large shareholders. Corporate investments may be made by agents, (rather than principals), who do not experience a direct increase in wealth or compensation from an increased IPO firm share price.[32] Furthermore, corporate investments may be made for strategic purposes, envisioning synergies or strategic ties later in the life of the firm (Hellmann, 2002). In this case, the corporate investor may be more interested in preserving strategic goals than ensuring optimal governance or value maximization.

If the effects of venture backing documented in the previous sections are merely a large shareholder effect, I would expect to see similar effects on governance in non–venture-backed firms that have other types of active pre-IPO large shareholders. Using the detailed 1994 subsample, I identify types of pre-IPO active large shareholders of non–venture-backed firms. As described in Section 2, a shareholder is considered to be an "active" large shareholder if he owns a 5% or greater stake in the firm pre-IPO and has board representation. As such, some non–venture-backed firms in the subsample do not have any active large shareholder. There are two main types of active large shareholder prevalent in the sample: corporate shareholders—corporations and outside holding companies—and individual or angels investors[33].

[31] This argument is consistent with survey evidence in Prowse (1998), who documents that most angels are unsophisticated investors who lack the ability to add value to a firm, and Wong (2001), who documents that angels are more passive than VCs.

[32] Block and Ornati (1987) and Lawler and Drexel (1981) provide a description of corporate VC compensation practices. Gompers and Lerner (2000) provide an overview of the corporate venture capital industry.

[33] While non-VC private equity funds, such as buyout funds, do invest in companies that are eventually brought public, the sample excludes LBO firms, as the subsample period contained only two such firms that could be matched to all the relevant databases. Due to this small sample size, I do not examine the effects of buyout funds in the analysis. Perhaps unsurprisingly, given the close involvement of LBO firms in their portfolio companies, when included, LBO fund backing appears to have similar effects to venture backing.

For all the non–venture-backed firms in the sample, I define two indicator variables, CORP and ANGEL, which take the value 1 if the firm has an active corporate or individual large shareholder, respectively, and 0 otherwise. I then reestimate the models in previous sections with the addition of the CORP and ANGEL variables on the right-hand side of each model. Of the 124 non–venture-backed firms in the subsample, 12 firms have a corporate large shareholder and 9 have a non-VC individual angel shareholder. For brevity, I do not report the results from these estimations in detailed tables.

I first examine the level of discretionary accruals, adding the variables CORP and ANGEL to the models estimated in Table II. As large shareholder data are available only for the hand-collected 1994 subsample, I am restricted to the firms in that sample for whom sufficient data are available in Compustat to be included in the tests (148 of the 232 firms). The coefficient on VC is a negative and significant 0.25 of total firm assets, similar to the estimate from the treatment model in Section 3.[34] In contrast, the coefficients on CORP and ANGEL are not significantly different than zero, and the null hypothesis of equality between the coefficient on VC and on ANGEL is rejected at the 5% level.

Similarly, in the probit analysis of the indicator variable for aggressive accounting, the coefficient on VC is negative and significant, while the coefficients on CORP and ANGEL are not significantly different from zero. In probit analysis of the indicator variable for conservative accounting, the coefficient on VC is positive, suggesting that venture backing is associated with a higher probability of employing conservative accounting, but the coefficients on CORP and ANGEL are both insignificant. Once again in these models, the null hypothesis of equality between the coefficient on VC and on ANGEL is rejected at the 5% level.

Next, I reestimate the models for board and committee composition, adding the variable CORP and ANGEL, in addition to the variables CORPTENUREX and ANGELTENUREX, which are interactions between the log of the number of years the corporate or private equity large shareholder has been on the board of directors of the firm and an indicator variable taking the value 1 if the firm has a corporate or private equity investor, respectively, and 0 otherwise. These tenure variables control for the power of outside investors, which may affect board composition (as per Hermalin and Weisbach, 1998), and are the counterparts to the control variable VCTENUREX included in the original models. The estimates on VC and the control variables are qualitatively similar in sign and magnitude to the estimates in the tests in Section 5. The coefficient on VC is positive and significant. The coefficients on CORP and ANGEL, in contrast, are not statistically significant.

[34] This estimate is also similar to the estimate obtained in unreported regressions for Equation (2) using only the 1994 subsample data.

Equivalent results are apparent in estimates of the model for the logit transform for the proportion of insiders. In both the above models, the null hypothesis of equality between the coefficient on venture backing and the coefficient on ANGEL are rejected at the 5% level. Once again, the coefficients on the control variables are similar in sign and magnitude to the estimates in the tests in Section 5. I find similar patterns for an analysis of the indicator variable for CEO/chairman duality and in the models analyzing audit and compensation committee composition.

While the sample of non–venture-backed firms with an active large shareholder is small, these results suggest that the effects documented in previous sections of this paper are not merely large shareholder effects but rather are at least in part specific to venture capital backing. In particular, the differences between the effect of venture capital backing versus angel or individual investor backing support the notion that active involvement in and/or control of the firm pre-IPO is requisite for mitigating governance problems when the firm is newly public.

7. Conclusions

In this paper, I examine the role of financial intermediary involvement in the entrepreneurial firm by exploring the effect of pre-IPO venture capital backing on the subsequent corporate governance of the newly public firm. Using a unique data set constructed from four commercially available databases and two hand-collected data sets, I conduct three sets of tests comparing governance- and monitoring-related variables for venture-backed and non–venture-backed firms. The findings are consistent with pre-IPO venture capital backing having an effect on the governance and monitoring of the entrepreneurial firm at the time of transition to the public markets. Other types of pre-IPO large shareholders, such as corporate and angel investors, do not appear have similar effects on the governance of the entrepreneurial firm.

The paper contributes to the growing literature on the role played by venture capital in the building of entrepreneurial firms. The findings suggest that the effects of venture capital backing can be significant even at the time of transition to dispersed public ownership and to the extent that governance is path dependent, for some period following the IPO. That said, while this paper sheds light on the effect of pre-IPO VC involvement in the firm on the governance at and around the time of public offering, it leaves to future research the study of the effect of post-IPO VC involvement on the evolving governance of the firm.

The paper also contributes to the large literature on the corporate governance of the firm, which has tended to focus on large public companies. It suggests one possible source of the observed heterogeneity in the governance structures of IPO firms. The results of this paper add to emerging evidence that, left to their own devices,

entrepreneurs might not set optimal, value-maximizing governance structures at the time of IPO. Future theory studies may wish to address the question of entrepreneurial incentives at the time of transition from private to public ownership.

Appendix A: The Modified Jones (1991) Model for Discretionary Accruals

The Jones (1991) model follows the suggestion of Kaplan (1985) that accruals likely result from the exercise of managerial discretion and from changes in the firm's economic conditions. The model is based on two main assumptions (i) that accruals resulting from changes in the firm's economic environment are related to changes in sales or sales growth and (ii) that gross property, plant and equipment expenditure controls for those accruals related to nondiscretionary depreciation expense.

The modified Jones model is given by

$$\frac{\mathrm{ACC}_{t,i}}{\mathrm{TA}_{t-1,i}} = \beta_1 \frac{1}{\mathrm{TA}_{t-1,i}} + \beta_2 \frac{\Delta S_{t,i} - \Delta \mathrm{Rec}_{t,i}}{\mathrm{TA}_{t-1,i}} + \beta_3 \frac{\mathrm{PPE}_{t,i}}{\mathrm{TA}_{t-1,i}} + \epsilon, \qquad \text{(A1)}$$

where $\mathrm{ACC}_{t,i}$ are the firm's total accruals at time t; $\mathrm{TA}_{t-1,i}$ are the firm's assets at time $t-1$ (Compustat Item 6); and $S_{t,i}$, $\mathrm{Rec}_{t,i}$, and PPE_t are the firm's sales (Compustat Item 12), net receivables (Item 2 minus Item 67), and the property, plant and equipment at time t (Item 7), respectively. The scaling by total firm assets corrects for the fact that in any large sample of firms including companies of various sizes, we cannot meaningfully compare the raw level of accruals of one firm with another.

The coefficients β_1, β_2, and β_3 are estimated cross-sectionally by industry and time period. In each period, the industry-specific coefficients are calculated using data from all the firms in that industry in that period. While the modified Jones (1991) model can also be estimated in a time series fashion, I examine a sample of IPO firms, and as a result historical time series data on the firms accruals and accounting line items is not available. Bartov, Gul, and Tsui (2000) and Subramanyan (1996) also note that the cross-sectional version of the modified Jones model is superior, *ex ante*, to the time series version. First, the number of observations used in each estimation is considerably higher in the cross-sectional version, increasing the precision of the resulting coefficient estimates. Second, by not requiring a history of time series data, the cross-sectional model is less subject to survival bias and allows the inclusion of firms with short histories. Third, nonstationarity is much less of a concern for the cross-sectional version than it is for the time series version.

The firm's non-discretionary accruals (NDA_t) are the firm's contemporaneous forecasted levels of scaled accruals, using the industry-specific coefficients

estimated from the past period's data and the firm's current-period accounting line items (S_t, Rec_t, and PPE_t):

$$\text{NDA}_{\text{t,i}} = \widehat{\beta}_1 \frac{1}{\text{TA}_{t-1,i}} + \widehat{\beta}_2 \frac{\Delta S_{t,i} - \Delta \text{Rec}_{t,i}}{\text{TA}_{t-1,i}} + \widehat{\beta}_3 \frac{\text{PPE}_{t,i}}{\text{TA}_{t-1,i}}. \quad \text{(A2)}$$

Discretionary accruals are then the difference between scaled total accruals and the nondiscretionary accruals

$$\text{DACC}_{t,i} = \frac{\text{ACC}_{t,i}}{\text{TA}_{t-1,i}} - \text{NDA}_{t,i}. \quad \text{(A3)}$$

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