



## American Finance Association

---

Venture Capitalists and the Oversight of Private Firms

Author(s): Josh Lerner

Source: *The Journal of Finance*, Vol. 50, No. 1 (Mar., 1995), pp. 301-318

Published by: Blackwell Publishing for the American Finance Association

Stable URL: <http://www.jstor.org/stable/2329247>

Accessed: 16/03/2010 00:25

---

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=black>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).



Blackwell Publishing and American Finance Association are collaborating with JSTOR to digitize, preserve and extend access to *The Journal of Finance*.

<http://www.jstor.org>

## Venture Capitalists and the Oversight of Private Firms

JOSH LERNER\*

### ABSTRACT

This article examines the representation of venture capitalists on the boards of private firms in their portfolios. If venture capitalists are intensive monitors of managers, their involvement as directors should be more intense when the need for oversight is greater. I show that venture capitalists' representation on the board increases around the time of chief executive officer turnover, while the number of other outsiders remains constant. I also show that distance to the firm is an important determinant of the board membership of venture capitalists, as might be anticipated if the oversight of local firms is less costly than more distant businesses.

FINANCIAL INTERMEDIARIES SUCH AS banks and venture capital organizations are increasingly understood to play a role distinct from that of other capital providers. Because they gain a detailed knowledge of the firms that they finance, these inside investors can provide financing to young businesses that otherwise would not receive external funds. (Bhattacharya and Thakor (1993) and Barry (1994) review the theoretical literature.) Many of the specific institutional features of these financial intermediaries are shaped by the need to provide monitoring and to limit the opportunistic behavior that this type of inside access can engender (see Rajan (1992) and Admati and Pfleiderer (1994)).

These theoretical insights have spurred empirical research into the relationships between inside investors and the firms in their portfolios. Several studies have examined the ties between banks and the firms that they finance.<sup>1</sup> Reflecting the difficulty of data collection, relatively little attention

\* Harvard University. George Baker, Carliss Baldwin, Richard Caves, Joetta Forsyth, Stuart Gilson, Paul Gompers, Zvi Griliches (my dissertation chair), Lisa Meulbroek, Edward Rice, Richard Ruback, William Sahlman, Andrei Shleifer, Erik Sirri, René Stulz (the editor), Howard Stevenson, Eli Talmor, Peter Tufano, Michael Vetsuypens, Karen Wruck, and two anonymous referees made helpful comments. Jesse Reyes of Venture Economics, Mark Edwards of Recombinant Capital, and Mark Dibner of the North Carolina Biotechnology Center provided data; Michael Fogarty and Neil Bania of Case Western Reserve University provided computational support. Wendy Wood helped with data coding. Financial support was provided by the Consortium on Competitiveness and Cooperation, the Center for Science and International Affairs, Kennedy School of Government, Harvard University, and the Division of Research, Harvard Business School. Any errors and omissions are my own.

<sup>1</sup> A series of studies, beginning with James (1987), document that the presence of bank loans is a favorable signal to other capital providers. Hoshi, Kashyap, and Scharfstein (1990) and Petersen and Rajan (1994) show that relationships with banks enable firms to receive financing at times when other businesses cannot. Kaplan and Minton (1994) suggest that bank-affiliated directors are appointed to the boards of Japanese firms that encounter financial difficulties.

has been devoted to the role of venture capital organizations. This is unfortunate, as venture capitalists finance firms with few tangible assets that banks—even in countries where they can hold equity in firms—find difficult to finance. Venture capitalists are understood to provide intensive oversight of the firms in their portfolios. Their involvement includes service on the boards of firms in their portfolios, frequent informal visits, meetings with customers and suppliers, and active involvement in key personnel and strategic decisions.<sup>2</sup>

This article examines the role of venture capitalists as monitors of private firms using evidence from boards of directors. I examine whether venture capitalists' representation on the boards of the private firms in their portfolios is greater when the need for oversight is larger. This approach is suggested by Fama and Jensen (1983) and Williamson (1983), who hypothesize that the composition of the board should be shaped by the need for oversight. These authors argue that the board will bear greater responsibility for oversight—and consequently that outsiders should have greater representation—when the danger of managerial deviations from value maximization is high. If venture capitalists are especially important providers of managerial oversight, their representation on boards should be more extensive at times when the need for oversight is greater.

I examine changes in board membership around the time that a firm's chief executive officer (CEO) is replaced, an approach suggested by Hermalin and Weisbach's (1988) study of outside directors of public firms. The replacement of the top manager at an entrepreneurial firm is likely to coincide with an organizational crisis and to heighten the need for monitoring. I find that an average of 1.75 venture capitalists are added to the board between financing rounds when the firm's CEO is replaced in the interval; between other rounds, 0.24 venture directors are added. No differences are found in the addition of other outside directors.

Venture capitalists' oversight of new firms involves substantial costs. The transaction costs associated with frequent visits and intensive involvement are likely to be reduced if the venture capitalist is proximate to the firms in his portfolio. Consistent with these suggestions, I find that geographic proximity is an important determinant of venture board membership: organizations with offices within 5 miles of the firm's headquarters are twice as likely to be board members as those more than 500 miles distant. Over half the firms in the sample have a venture director with an office within 60 miles of their headquarters. This has important implications due to the uneven

<sup>2</sup> Gorman and Sahlman (1989) report that the average lead venture capitalist visits each company in his portfolio nineteen times annually. Empirical work on this topic includes Barry *et al.*'s (1990) documentation that venture capitalists have a substantial representation on the boards of private firms, that their lengthier tenure on the board is associated with reduced underpricing of IPOs, and that venture involvement continues well after the firm goes public. Gompers (1994) argues that venture capitalists adjust the size and timing of venture investments to address agency problems. Much of our knowledge, however, stems from clinical studies and surveys (reviewed in Sahlman (1990)).

regional distribution of venture capitalists. Petersen and Rajan (1993) demonstrate that the concentration of bank credit can lead to highly different financing patterns across markets. The presence or absence of venture capitalists may likewise lead to significant differences in the availability and pricing of venture capital across regions.

This article differs from other work on venture capital in its focus on a single industry, biotechnology. My approach allows me to use a variety of industry-specific information sources. Through these data sources, I can more thoroughly analyze the behavior of firms that ultimately went public and include in my sample many firms that were acquired or terminated before going public. I compare board membership in this sample with the interindustry population of venture-backed initial public offerings (IPOs) assembled by Barry *et al.* (1990) and find few differences.

The organization of the article is as follows. In Section I, I discuss the sample that I employ. In Section II, I present the empirical analysis. Section III concludes the article.

## I. The Sample

I base this analysis on the database of venture capital financings assembled by Venture Economics. I introduce the Venture Economics database in the companion article to this one (Lerner (1994)). Because this database has only recently become available to researchers,<sup>3</sup> in this Section I discuss the completeness and accuracy of the sample that I employ.

The database identifies 307 biotechnology firms that received venture capital as privately held entities between 1978 and 1989. (While the database contains earlier records, data collection was not a primary focus prior to mid-1977). From the original sample, I drop thirteen foreign firms that were funded by U.S. capital providers (who may face different regulatory, tax, or institutional environments), four buy-outs or divisional "spin-outs" involving private capital providers, three duplicative entries of the same firm under different names (I find name changes in *Capital Changes Reporter* (Commerce Clearing House (1992)), *Directory of Obsolete Securities* (Financial Stock Guide Service (1992)), *Documentation for Companies Database* (North Carolina Biotechnology Center (NCBC) (1990b)), *Predicasts F & S Index of Corporate Change* (Predicasts, Inc. (1992)), and other sources), and sixteen firms that received venture capital only after going public.

To assess the completeness of the remaining 271 firms, I identify firms missing from the sample. I search for U.S. biotechnology firms that received

<sup>3</sup> Venture Economics has focused on collecting data on venture investments since 1977. Researchers' access to this data was very restricted prior to the firm's purchase by Securities Data Company (SDC) in 1991. Venture Economics did, however, publish the names of investors in firms that went public in their *Venture Capital Journal*. Barry *et al.* (1990) and Megginson and Weiss (1991) use this information (and, in the former article, cross-tabulations of these records). Much of the Venture Economics data are now publicly available as the SDC Venture Intelligence Database.

venture capital as privately held firms but are not in the Venture Economics sample. I use Securities and Exchange Commission (SEC) filings,<sup>4</sup> the records of Recombinant Capital (1991, 1992), a San Francisco-based firm specializing in collecting information on the biotechnology industry from SEC filings and state filings, several industry directories (Corporate Technology Information Services (1992), Mega-Type Publishing (1992), NCBC (1990b), and Oryx Press (1992)) that list privately held firms and provide information about their financing sources, press releases in Mead Data Central's (1988) NEXIS/ALLNEWS and LEXIS/PATENT/GENBIO files, and contacts with venture capitalists and biotechnology firms. These efforts lead to the identification of an additional 37 U.S. biotechnology firms that received venture capital as privately held entities between 1978 and 1989.<sup>5</sup>

I assess the significance of the 37 omitted firms using three measures. First, I use a U.S. Department of Commerce, Patent and Trademark Office (1990) compilation of all biotechnology patent awards from January 1978 through June 1989. Patenting is extremely important in biotechnology and is the focus of virtually every small biotechnology firm. Of the entire number of patents awarded to venture-backed biotechnology firms in this period, the Venture Economics sample accounts for over 98 percent. Second, the NCBC (1990a) compiles an "Actions" database of events in the biotechnology industry (including regulatory approvals, product introductions, and ownership changes) from press releases and specialized trade journals. Firms in the Venture Economics sample account for over 95 percent of the entries about venture-backed firms between November 1978 (the inception of the database) and December 1989. Finally, using data from Venture Economics, Recombinant Capital, SDC's Corporate New Issues database, SEC filings, and press releases, I determine (or, in a few cases, estimate) the total amount of external financing received by venture-backed firms. The Venture Economics sample accounts for over 91 percent of the financing raised by these firms between 1978 and 1989. Taken together, the results suggest that the omitted firms are less significant than the ones included.

I correct the information on these firms' financing rounds as follows:

- *Firms included in the Recombinant Capital database.* I compare the Venture Economics records to those of Recombinant Capital. If they are

<sup>4</sup> I identify IPOs and acquisitions of biotechnology firms through *Capital Changes Reporter* (Commerce Clearing House (1992)), *Directory of Obsolete Securities* (Financial Stock Guide Service (1992)), *Going Public: The IPO Reporter* (Howard and Company (1992)), *Documentation for Actions Database* (NCBC (1990a)), and *BioScan: The Worldwide Biotech Industry Reporting Service* (Oryx Press (1992)).

<sup>5</sup> As of 1989, Venture Economics (1989) had gathered information on approximately 65 percent of funds formed between 1970 and 1987. Because firms are usually financed by multiple venture funds, the comprehensiveness of their information on venture-backed firms is considerably higher than their coverage of funds. When Venture Economics obtains information on the same company from several sources, their staff attempts to reconcile any inconsistencies. If they are unable to resolve conflicts, their tendency is to err on the side of inclusiveness. This is part of the reason for the inclusion of multiple records for a single venture round discussed below.

identical, I consider the Venture Economics records as corroborated.<sup>6</sup> If they conflict, and SEC filings are available, I use these to resolve the conflict. If they conflict, and SEC filings are not available, I rely on company and venture capitalist contacts. If I cannot make any contacts, I use the Venture Economics data.

- *Firms not included in the Recombinant Capital database, but with SEC filings.* I compare the Venture Economics records to the SEC filings. If they conflict, I use the SEC filings.
- *Firms not included in the Recombinant Capital database without SEC filings.* I rely on company and venture capitalist contacts to corroborate the Venture Economics data. If I am unable to make any contacts, I use the Venture Economics data.

Table I summarizes the final sample, disaggregated by year and round of investment. The table presents the number of financing rounds, as well as the cumulative and average size of these transactions. (All size figures are in millions of 1989 dollars.) Observations are concentrated in the latter half of the sample. While no trend appears in the size of transactions over time, the greater size of later financing rounds is apparent (Sahlman (1990)).

I compare the Venture Economics dataset to the corrected information, omitting the cases where I am unable to obtain any corroboration of the Venture Economics records. For each firm, I compute the ratio of the reported to the actual size and number of private financings. I find that the reporting of the amount of external financing provided is unbiased, with the ratio of total funds recorded in the Venture Economics database to the actual amount being 1.04. The number of venture rounds, however, is overstated: the database reports 28 percent more rounds than actually occurred. I disaggregate the data to determine whether the bias in the number of rounds varies in a systemic manner. I divide rounds by the age of the firm and the date at the time of the venture round. I find that the spurious rounds are most frequent in older firms and in chronologically earlier records. This may be due to a single round being recorded as two or more rounds when all the cash is not disbursed simultaneously, whether by accident or design, or when the various sources of information aggregated by Venture Economics differ. Both problems are likely to be more severe in later rounds, which typically have more investors.

I find information about the boards of these firms in several locations. IPO prospectuses report board members at the time of the offering, and in many cases indicate former board members in the "Certain Transactions" and "Principal and Selling Shareholders" sections. When these listings do not mention former directors, I check the firm's original and amended articles of incorporation, which are usually reproduced in its S-1 registration statement.

<sup>6</sup> I do not include as external financing rounds situations where founders contributed a small amount of funds (typically under \$20,000) in exchange for common stock, or bridge loans by venture capital providers in the six months prior to the IPO, due immediately after the offering. These entries are relatively infrequent in the Venture Economics dataset.

**Table I**  
**The Corrected Financings Sample**

The table presents the number of financing rounds of private biotechnology firms in the corrected Venture Economics sample, the total dollars disbursed, and the average size<sup>a</sup> of each round (in millions of 1989 dollars). The sample consists of 653 financing rounds of 271 biotechnology firms between 1978 and 1989. Financing rounds are segmented by year and by round number.

Panel A. Financings Segmented by Year			
Year	Number of Rounds	Aggregate Size (1989 \$ Millions)	Average Size (1989 \$ Millions)
1978	7	17.23	2.46
1979	8	54.43	6.80
1980	16	123.45	7.72
1981	41	140.88	3.61
1982	46	195.17	4.34
1983	62	227.88	3.80
1984	46	142.84	3.32
1985	55	149.14	3.04
1986	79	269.94	3.70
1987	102	359.98	3.79
1988	102	307.30	3.23
1989	89	336.46	4.31

  

Panel B. Financings Segmented by Round Number			
Financing Round	Number of Rounds	Aggregate Size (1989 \$ Millions)	Average Size (1989 \$ Millions)
First round	270	527.10	2.11
Second round	186	689.31	3.94
Third round	113	651.02	6.14
Later round	84	457.28	5.94

<sup>a</sup> Because I cannot determine the size of some financing rounds, the aggregate size does not equal in all cases the product of the number of rounds and the average round size.

Information is often available about the boards of private firms that are acquired by public firms or file for an abortive IPO in the acquirers' proxy, 10-K, or 10-Q statements, or in the (ultimately withdrawn) registration statements. In addition, in the fall of 1990 I gathered the material on these firms in the files of the North Carolina Biotechnology Center. The NCBC has solicited information from public and private firms on an annual basis. Their files include promotional material (used to produce an industry directory) and surveys conducted for the U.S. Office of Technology Assessment. These materials detail both the firms' managements and their boards.

The IPO prospectuses provide biographies of directors. Other sources, however, often only list directors' names. I identify directors using *Pratt's Guide to Venture Capital Sources* (Venture Economics (1992)), biographical material in other prospectuses (many individuals serve on more than one board), general business directories (*Who's Who in Finance and Industry*

(Marquis Who's Who (1993)), *Register of Corporations, Directors, and Executives* (Standard and Poor Corporation (1993)), and *BioPeople* (BioVenture View (1993))). I supplement these sources with information from the *Documentation for Actions Database* (NCBC (1990a); a compilation of trade magazine stories) and Mead Data Central's databases.

Panel A of Table II presents the distribution of board members by round of investment. I use each case where I know the board members at the time of the investment or within three months of the investment date. Following Baysinger and Butler (1985), I divide directors into quasi insiders, outsiders, and insiders. Quasi insiders are those parties who do not work directly for the firm, but who have an ongoing relationship with the concern. I count affiliated academics who hold full-time teaching or clinical positions as quasi insiders rather than insiders, even if they hold an official title in the firm and draw substantial compensation. Outside directors include investors and disinterested outsiders. I include in this category representatives of corporations who have invested in or financed research at the firm.<sup>7</sup> I distinguish between venture capitalists and other outsiders.<sup>8</sup>

The number of board members increases in each round, from a mean of four in the first round to just under six in the fourth and later rounds. In the fourth and later rounds, venture capitalists control a mean of 2.12 board seats. This sample corresponds closely to the inter-industry population of 433 venture-backed IPOs of Barry *et al.* (1990). In their mean firm, venture capitalists control two out of six board seats. I present the distribution of the directors in more detail in Panel B. In this table, I use only one observation of each firm: the directors at the time of the last round of venture financing in the sample period.

## II. Empirical Analysis

### A. Board Membership and CEO Turnover

I examine changes in board composition around the time of turnover of these firms' CEOs. I expect that the need for monitoring will be greater in these cases. As with public firms (Weisbach (1988)), the replacement of the CEO frequently occurs when the firm is encountering difficulties. In addition,

<sup>7</sup> A number of corporations, rather than investing directly in smaller firms, channel their funds through a corporate venture capital subsidiary. In these cases, a corporate venture capitalist may sit on the board. I count these officials as other outsiders rather than as venture capitalists. I repeat the analysis in Section II.A, recording these individuals as venture capitalists. Neither the magnitude nor the significance of the results changes markedly.

<sup>8</sup> I define venture capitalists as individuals who are general partners or associates at partnerships focusing on venture capital investments (i.e., equity or equity-linked securities with active participation by the fund managers in the management or oversight of the firms). I count these individuals as venture capitalists, even if they officially work for the firm. (Most partnership agreements between general and limited partners require that salaries be paid out of the management fee and not by the fund. Venture capitalists can get around this restriction by being paid by a firm in their portfolio.) I only include venture organizations that are either unaffiliated with any other organization or else affiliated with a financial institution.

**Table II****The Board Membership of Private Biotechnology Firms**

The sample consists of 653 financing rounds of 271 biotechnology firms between 1978 and 1989; I present the board membership by round for each of the 362 rounds where membership can be determined. Venture Capitalists are defined as individuals who are general partners or associates at venture capital organizations that are either unaffiliated with any other organization or else affiliated with a financial institution. I count full-time affiliates of a venture capital organization as venture capitalists, even if they work for a venture-backed firm. Other Outsiders include corporate investors, other investors (individuals who (i), either alone or in a partnership, held a five percent stake in the organization at some time, (ii) never were an officer of the firm, and (iii) never were an affiliate of a company which signed a collaborative arrangement with the firm or of a venture investor), and individuals that do not have another relationship with the firm. Insiders are either senior (the chief executive officer, president, and chairman of the board) or junior managers employed directly by the firm. Quasi Insiders are those parties who do not work directly for the firm, but who have an ongoing relationship with the concern. Panel B reports the professional affiliation of board members at the time of the last financing round in the sample.

Panel A. Board Membership by Round Number				
Financing Round	Mean Number of Board Members			
	Venture Capitalists	Other Outsiders	Insiders	Quasi Insiders
First round	1.40	0.86	1.28	0.52
Second round	1.87	0.86	1.40	0.56
Third round	2.09	1.02	1.61	0.67
Later round	2.12	1.27	1.73	0.54

  

Panel B. Professional Affiliation of Board Members at Time of Last Financing Round (%)	
Outside directors	
Venture capitalist	36.2
Corporate partner	6.4
Other investor	3.1
Executive with other health care or biotechnology firm	3.5
Retired health care or high-technology executive	3.6
Academic without firm affiliation	0.9
Lawyer, consultant, or investment banker without firm affiliation	1.4
Other or unidentified	5.1
Inside directors	
Senior manager	20.3
Junior manager	7.1
Quasi-inside directors	
Academic affiliated with the firm	8.9
Lawyer affiliated with the firm	0.5
Investment or commercial banker affiliated with the firm	1.0
Former manager of the firm	0.6
Relative or other	1.3

since the uncertainty about the new CEO's ability is likely to be high, his activity may be more intensively monitored.<sup>9</sup>

I only identify as cases of CEO turnover instances where the firm's top executive was replaced. I wish to avoid instances that may generate a spurious correlation between the addition of board members and CEO turnover; e.g., cases where neither a CEO has been hired nor a complete board assembled when the firm begins operations. I consequently do not include instances when a venture capitalist who originally held the title of "chairman and CEO" relinquishes the second title. I similarly eliminate cases where a firm run by an "acting CEO" or by one or more vice presidents hires a full-time chief.

I identify cases of CEO turnover using the sources described above. I identify 40 cases of CEO turnover meeting my criteria. Few of these changes are retirements: the median age of the exiting CEOs at the time of the last financing round in which they are in office is 40. (The median age of the CEOs holding office at the time of the last financing round in the sample is 43.) Only one replaced CEO is between the ages of 64 and 66 at the time of his exit, the criterion used by Weisbach (1988) to identify CEO retirements.

Table III summarizes the changes in board membership between venture rounds. I first examine the 180 second or later venture rounds where I know the board membership at the time of the current and previous financing round and there was no CEO turnover in this interval. (I also include cases where I have an observation of board members up to three months after the financing.) There is a slight increase in the representation of each class of board member.

I then examine the 40 rounds in the sample where I know the board membership at the time of the current and previous financing and where there was CEO turnover in this interval.<sup>10</sup> In these rounds, the representation of each class of board member increases at a greater rate than between rounds without CEO turnover. The increase in insiders and quasi insiders is not surprising, as in some cases the departing CEO will remain a board member, whether he continues as a lower level employee or becomes an ex-employee (who are classified as quasi insiders). By far the largest increase (1.75) is in the number of venture directors. I test whether the change in the number of directors is the same in rounds with and without CEO turnover. I use *t*-tests and Wilcoxon tests. Because in each case an *F*-test rejects the

<sup>9</sup> Robert Kunze (1990) of Hambrecht and Quist notes that the replacement of the CEO "is the *single most critical development* in the life of a baby company. The time spent hiring the new chief executive officer, the shock to the organization when the changeover takes place, the lack of direction in the interim, the quality of the new person hired, and the speed with which he or she seizes command, all impact heavily on the health and potential of the company. In the best of circumstances replacing a chief executive officer is a wrenching experience and companies can easily fail at this juncture."

<sup>10</sup> I examine whether the 40 rounds coinciding with CEO replacements differ from the other 180: e.g., if they tend disproportionately to be early venture rounds. I find that the distribution of rounds with and without CEO turnover are virtually identical.

**Table III**  
**The Changes in Board Membership between Financing Rounds**

The sample consists of 220 second or later financing rounds where the board membership at the time of the current and previous round can be determined. Panel A indicates the change in board membership since the last financing round, divided by whether chief executive officer (CEO) turnover occurred. Venture Capitalists are defined as individuals who are general partners or associates at venture capital organizations that are either unaffiliated with any other organization or else affiliated with a financial institution. I count full-time affiliates of a venture capital organization as venture capitalists, even if they work for a venture-backed firm. Other Outsiders include corporate investors, other investors (individuals who (i), either alone or in a partnership, held a 5 percent stake in the organization at some time, (ii) never were an officer of the firm, and (iii) never were an affiliate of a company that signed a collaborative arrangement with the firm or of a venture investor), and individuals that do not have another relationship with the firm. Insiders are managers employed directly by the firm. Quasi Insiders are those parties who do not work directly for the firm, but who have an ongoing relationship with the concern. Panel B presents  $p$ -values from  $t$ -tests and non-parametric Wilcoxon tests of whether the change in board membership differs in rounds with CEO turnover. The  $t$ -tests do not assume that the two distributions have the same variance.

Panel A. Changes in Board Membership between Financing Rounds				
	Mean Change in the Number of Board Members Since the Last Financing Round			
	Venture Capitalists	Other Outsiders	Insiders	Quasi Insiders
180 rounds without CEO turnover	+0.24	+0.28	+0.10	+0.06
40 rounds with CEO turnover	+1.75	+0.33	+0.23	+0.25

  

Panel B. Tests of Equality of Changes in Board Membership between Financing Rounds				
	$p$ -Value, Test of Null Hypothesis of No Difference between CEO Turnover Rounds and Other Rounds			
	Venture Capitalists	Other Outsiders	Insiders	Quasi Insiders
$p$ -value, $t$ -test	0.000	0.750	0.339	0.140
$p$ -value, Wilcoxon test	0.000	0.519	0.094	0.297

equality of variances, I do not assume in the  $t$ -tests that the distributions have the same variance. I employ non-parametric Wilcoxon tests, because the change in the number of board members is an ordinal number. Panel B presents the  $p$ -values from these tests. The increase in the representation of venture board members is significantly larger when there is CEO turnover. The differences in the changes of other directors are insignificant.

I then examine these patterns econometrically. Following Hermalin and Weisbach (1988), I employ a Poisson specification and examine the number of new directors. (In these regressions, a goodness-of-fit test cannot reject the Poisson specification.) I run two separate regressions, using as dependent variables the number of new directors who are venture capitalists and other outsiders. I use all 216 second and later venture rounds where I know both

the board membership and funds provided at the time of the current and previous rounds. As independent variables, I use a dummy variable indicating if there was CEO turnover between the current and previous venture round (with 1.0 indicating such a change) and two control variables. The first controls for the difference between the funds provided in the current and previous venture round (expressed in millions of 1989 dollars). An increase in funding may lead to the involvement of new investors, who may be offered a board seat. The second controls for the number of directors who have exited the board since the previous round. As Hermalin and Weisbach note, if firms routinely fill vacated board seats, a regression without such a control may be biased.

As Panel A of Table IV reports, the coefficient of the CEO turnover variable in the venture capitalist regression, 1.88, is highly significant. At the mean of the other independent variables, the exit of the CEO increases the number of new venture directors from 0.25 to 1.59. This coefficient in the other outsider regression is of the opposite sign and insignificant. In Panel B, I compare the

**Table IV**  
**Poisson Regression Analysis of the Addition of Board Members between Financing Rounds**

The sample consists of 216 second or later financing rounds where the board membership at the time of and the amount invested in the current and previous round can be determined. In Panel A, I estimate separate regressions using the number of new directors who are venture capitalists and other outsiders as the dependent variable. Independent variables include a dummy indicating if there was chief executive officer (CEO) turnover between the previous and current round, the difference in the amount invested in the current and previous round (expressed in millions of 1989 dollars), and the number of board members who departed the board between the previous and current round. Absolute *t*-statistics are in brackets. In Panel B, I test whether the coefficients of the CEO turnover variable in the two regressions are equal.

Panel A. Poisson Regression Analysis of the Addition of Board Members between Financing Rounds		
	Dependent Variable:	
	Number of New Board Members who are . . .	
	Venture Capitalists	Other Outsiders
CEO turnover	1.88 [0.86]	-0.04 [0.13]
Change in dollars invested	0.02 [0.89]	-0.06 [2.28]
Number of departing board members	0.15 [2.06]	0.19 [1.41]
Constant	-1.43 [8.94]	-1.13 [8.00]
Log likelihood	-175.29	-157.20
$\chi^2$ -statistic	112.50	7.56
<i>p</i> -Value	0.000	0.056
Number of observations	216	216
Panel B. Test of the Equality of Coefficients in the Venture Capitalist and Other Outsider Regressions		
<i>p</i> -Value, $\chi^2$ -test of null hypothesis that CEO turnover coefficients are equal		0.000

coefficients of the CEO turnover variable in the venture capitalist and other outsider regressions. The table presents the  $p$ -value from the  $\chi^2$  test of the null hypothesis of no difference. I reject the null hypothesis at the one percent level of confidence. This difference is robust to modifications of these regressions. For instance, I add an independent variable that controls for the time between the current and previous venture round and create separate independent variables for each class of director who leaves the board. I also use the number of new investors as an independent variable instead of the increase in the funds provided.

Hermalin and Weisbach (1988) propose an alternative explanation for the addition of outside directors around a CEO succession. They suggest that corporate insiders who are passed over for the top position leave after a new CEO is selected. The firm—facing a shortage of qualified insiders—then fills the board seats with outsiders. This explanation is unlikely to apply here. Managers who depart private firms voluntarily often must pay a heavy financial penalty: selling their shares back to the firm at the same discounted price that they originally paid (typically a small fraction of the current value). Consequently, voluntary departures of senior executives from private venture-backed firms are infrequent.

### *B. Board Membership and Geographic Proximity*

I also examine the distance between venture capitalists and the private firms on whose boards they sit. The cost of providing oversight is likely to be sensitive to the distance between the venture capitalist and the firm in which he invests. If the provision of oversight is a significant and costly role for venture capitalists, then proximity should be an important determinant of which venture investors serve on the board.

I first examine the geographic proximity of venture directors. To compute this measure, I use the zip codes in which the firm has its headquarters and the venture capital organization has its office nearest the firm. To determine the former, I use the specialized industry directories cited above and the records of Venture Economics. The latter information is available for each venture organization in several sources (Clay (1991), National Register Publishing Company (1992), Venture Economics (1988, 1992)). If possible, I use the edition of *Pratt's Guide* published in the year of the firm's final financing round in the sample. (*Pratt's* information is gathered through a survey of venture organizations conducted in January of the year of publication.) Since the Venture Economics database lists the name of the fund, I must determine the associated venture organization. The name of the venture organization is often obvious. (For instance, Mayfield, VII, L.P., is managed by the Mayfield Fund.) In other cases, I must use an unpublished Venture Economics database to identify the venture organization. To compute the distance between the zip codes, I employ a computer program developed by the Center for Regional Economic Issues at Case Western Reserve University. The program computes the mileage between the center of pairs of zip codes.

Panel A of Table V presents the distance from each firm's headquarters to its most proximate, furthest, and median venture director at the time of the last venture round in the sample. The results suggest that for the majority of the firms, the nearest venture director is quite close. More than half the firms have a venture director with an office within 60 miles of their headquarters. Twenty-five percent of the firms have a venture director within seven miles. Panel B examines the probability that a venture investor is a director at the time of the final round in the sample. The probability that a venture investor with an office within five miles of the firm serves as a director is 47 percent; for a venture capitalist whose nearest office is more than 500 miles away, the probability is 22 percent. An *F*-test examines whether these probabilities are equal. I reject the null hypothesis of no difference at the one percent confidence level.

To correct for other determinants of board membership, I estimate a probit regression. I use as observations each venture investor in the firm as of the last round in the sample. I use as the dependent variable a dummy indicating whether a representative of the venture organization served on the firm's board at the time of the last round in the sample (with 1.0 denoting a board member). I use as independent variables the distance from the investor's nearest office to the firm's headquarters (in thousands of miles) and several control variables. A venture organization with a larger equity stake in a firm should be more likely to be a director, as it has more at risk. I determine the stake that venture organizations hold in firms through the Venture Economics database, as well as information from Recombinant Capital and SEC filings. Larger and older venture capitalists may be more likely to serve as board members: experienced venture capitalists may either be more effective monitors or may more effectively certify the firm to potential investors. To determine the age and size of the venture organization, I use *Pratt's Guide* and several other sources (Clay (1991), National Register Publishing Company (1992), and Venture Economics (1988, 1992)). I express the age of each venture organization in years; size is the ratio of the capital committed to the venture organization at the time of the investment to the total pool of venture capital. I employ a ratio because the size of the venture pool changes dramatically over this period. I run separate regressions using venture capitalist age and size as control variables because these two measures are highly correlated.

I present the results in Panel C of Table V. The coefficient for distance is highly significant in explaining the service of venture capitalists on boards, even after controlling for ownership and experience. Since I cannot always compute the venture organization's stake, I omit this variable in the third and fourth regressions. The results are robust to the use of the larger sample.<sup>11</sup>

<sup>11</sup> In unreported regressions, I employ the logarithm of distance as an independent variable, which proves to have even more explanatory power.

**Table V**  
**The Relationship between Proximity and Board Membership  
 for Venture Investors**

I first present the distance (in miles) between the headquarters of the firm and the nearest office of each venture capitalist that served as a board member at the time of the last venture round in the sample. The sample consists of 700 pairs of venture capital organizations and private biotechnology firms. Panel B presents the relationship between probability of a venture investor serving as a board member and its distance to the firm, and the  $p$ -value from an  $F$ -test of this pattern. Panel C presents a probit regression analysis of the relationship between venture investor proximity and board membership. The dependent variable is a dummy indicating whether a representative of the venture organization served on the board at the time of the last venture round in the sample. (1.0 denotes a director.) Independent variables include the distance from the venture organization's nearest office to the headquarters of the firm (in thousands of miles), the fraction of the firm's equity held by the venture organization, the age of the venture organization (in years), and its size (the ratio of its committed capital to the total venture capital pool). I calculate all variables at the time of the last venture round in the sample. Absolute  $t$ -statistics are in brackets.

Panel A. Proximity of Venture Capitalist Directors				
Distance from Venture Capitalist's Nearest Office to Firm Headquarters (in Miles)				
	Mean	Median	First Quartile	Third Quartile
Nearest venture director	359	59	7	418
Median distance venture director	584	287	32	965
Furthest venture director	993	419	73	1951

Table V—Continued

Panel B. Relationship between Proximity of Venture Investor and Probability of Board Membership			
	Distance from Venture Capitalist's Nearest Office to Firm Headquarters (in Miles)		
	<5	5-50	50-500
Probability of joining board (%)	46.7	30.7	34.9
<i>p</i> -Value, <i>F</i> -test of null hypothesis of no relationship			21.8 0.000
Panel C. Regression Analysis of Board Membership			
	Dependent Variable: Venture Investor Served on Board		
	Using Venture Capitalist Age and Stake	Using Venture Capitalist Size and Stake	Using Venture Capitalist Age and Stake
Venture office to firm (000 miles)	-0.18 [3.72]	-0.20 [4.04]	-0.16 [4.16]
Stake held by venture organization	4.21 [6.96]	4.19 [6.61]	
Age of venture organization (years)	0.01 [1.54]		0.01 [2.18]
Organization's share of total venture pool		18.64 [2.17]	18.62 [2.77]
Constant	-0.86 [7.33]	-0.87 [7.57]	-0.51 [5.80]
Log likelihood	-319.48	-297.36	-413.19
$\chi^2$ -statistic	82.68	85.58	27.12
<i>p</i> -Value	0.000	0.000	0.000
Number of observations	580	548	700
			661

### III. Conclusion

This article examines the role of venture capitalists as directors of private venture-backed firms. I examine whether the representation of venture capitalists increases around the time of CEO turnover, as might be expected if these individuals were intensively monitoring managers. I find that unlike other outside directors, the representation of venture capitalists increases around such events. I also examine the geographic proximity of venture directors. Since the provision of oversight is costly, venture capitalists should seek to minimize this cost by overseeing local firms. I find that firms are likely to have a nearby director and that proximity is an important determinant of board membership. These findings complement earlier empirical studies of how venture capitalists address agency problems, as well as analyses of the ties between banks and the firms to which they lend.

The results of this analysis suggest several avenues for future investigation. The first of these is the impact of venture capitalists' involvement in firms after going public. Barry *et al.* (1990) and Lin and Smith (1994) document the continuing role of venture capitalists as directors and shareholders in the years after going public. In some cases, venture capitalists terminate their relationships with the firm quickly; but, in a significant number of instances, venture capitalists retain a board seat even after distributing their holdings to the limited partners of their funds. If venture capitalists are specialized providers of oversight, it might be expected that these firms will be less prone to agency problems.<sup>12</sup>

A second avenue for empirical analysis is suggested by the results concerning the importance of geographic proximity of venture capitalists. Regions differ dramatically in their concentration of venture capitalists (Florida and Smith (1993)). Akin to Petersen and Rajan's (1993) finding of differences across credit markets with different degrees of lending concentration, firms located in regions where venture capital is relatively scarce may face different price schedules for or availability of this form of financing.

<sup>12</sup> An alternative possibility is that a relationship between firm success and venture involvement exists, but that this pattern is driven by reverse causality. Venture capitalists may choose to remain on the boards of successful companies, whether out of the belief that board membership highlights their past accomplishments to outsiders or else out of hubris.

### REFERENCES

- Admati, A. R., and P. Pfleiderer, 1994, Robust financial contracting and the role of venture capitalists, *Journal of Finance* 49, 371-402.
- Barry, C. B., 1994, New directions in research on venture capital finance, *Financial Management* 23 3-15.
- , C. J. Muscarella, J. W. Peavy III, and M. R. Vetsuypens, 1990, The role of venture capital in the creation of public companies: Evidence from the going-public process, *Journal of Financial Economics* 27, 447-471.
- Baysinger, B. D., and H. N. Butler, 1985, Corporate governance and the board of directors: Performance effects of changes in board composition, *Journal of Law, Economics and Organization* 1, 101-124.

- Bhattacharya, S., and A. Thakor, 1993, Contemporary banking theory, *Journal of Financial Intermediation* 3, 2–50.
- BioVenture View, 1993, *BioPeople* (BioVenture, San Francisco).
- Clay, L., 1991, *The Venture Capital Report Guide to Venture Capital in Europe* (Pitman, London).
- Commerce Clearing House, 1992, *Capital Changes Reporter* (Commerce Clearing House, Chicago).
- Corporate Technology Information Services, 1992, *Corporate Technology Directory* (CorpTech, Woburn, Mass.).
- Fama, E. F., and M. C. Jensen, 1983, Separation of ownership and control, *Journal of Law and Economics* 26, 301–325.
- Financial Stock Guide Service, 1992, *Directory of Obsolete Securities* (Financial Information, Inc., Jersey City, N.J.).
- Florida, R., and D. F. Smith, 1993, Venture capital formation, investment, and regional industrialization, *Annals of the Association of American Geographers* 83, 434–451.
- Gompers, P. A., 1994, Optimal investment, monitoring, and the staging of venture capital, Working paper, University of Chicago.
- Gorman, M., and W. A. Sahlman, 1989, What do venture capitalists do?, *Journal of Business Venturing* 4, 231–248.
- Hermalin, B. E., and M. S. Weisbach, 1988, The determinants of board composition, *Rand Journal of Economics* 19, 589–606.
- Hoshi, T., A. Kashyap, and D. Scharfstein, 1990, The role of banks in reducing the costs of financial distress in Japan, *Journal of Financial Economics* 45, 33–60.
- Howard and Company, 1992, *Going Public: The IPO Reporter* (Howard, Philadelphia).
- James, C., 1987, Some evidence on the uniqueness of bank loans, *Journal of Financial Economics* 19, 217–235.
- Kaplan, S. N., and B. A. Minton, 1994, Appointments of outsiders to Japanese boards: Determinants and implications for managers, *Journal of Financial Economics* 36, 225–258.
- Kunze, R. J., 1990, *Nothing Ventured: The Perils and Payoffs of the Great American Venture Capital Game* (HarperBusiness, New York).
- Lerner, J., 1994, Venture capitalists and the decision to go public, *Journal of Financial Economics* 35, 293–316.
- Lin, T., and R. Smith, 1994, The unwinding of venture investments: Insider selling during equity IPOs, Working paper, Arizona State University.
- Marquis Who's Who, 1993, *Who's Who in Finance and Industry* (Marquis, Chicago).
- Mead Data Central, 1988, *Reference Manual for the LEXIS/NEXIS Services* (Mead, Dayton, Oh.).
- Mega-Type Publishing, 1992, *Genetic Engineering and Biotechnology-Related Firms—Worldwide Directory* (Mega-Type, Princeton Junction, N.J.).
- Meggison, W. L., and K. A. Weiss, 1991, Venture capital certification in initial public offerings, *Journal of Finance* 46, 879–903.
- National Register Publishing Company, 1992, *Corporate Finance Sourcebook* (National, Wilmette, Ill.).
- North Carolina Biotechnology Center, Biotechnology Information Division (NCBC), 1990a, *Documentation for Actions Database* (NCBC, Research Triangle Park, N.C.).
- , 1990b, *Documentation for Companies Database* (NCBC, Research Triangle Park, N.C.).
- Oryx Press, 1992, *BioScan: The Worldwide Biotech Industry Reporting Service* (Oryx Press, Phoenix, Ariz.).
- Petersen, M. A., and R. G. Rajan, 1993, The effect of credit market competition on firm-creditor relationships, Working paper, University of Chicago.
- , 1994, The benefits of lending relationships: Evidence from small business data, *Journal of Finance* 49, 3–37.
- Predicasts, Inc., 1992, *Predicasts F & S Index of Corporate Change* (Predicasts, Inc., Cleveland, Oh.).
- Rajan, R. G., 1992, Insiders and outsiders: The choice between informed and arm's-length debt, *Journal of Finance* 47, 1367–1399.

- Recombinant Capital, 1991, *Valuation Histories for Private Biotechnology Companies* (Recombinant Capital, San Francisco).
- , 1992, *Valuation Histories for Public and Acquired Biotechnology Companies* (Recombinant Capital, San Francisco).
- Sahlman, W. A., 1990, The structure and governance of venture-capital organizations, *Journal of Financial Economics* 27, 473–521.
- Standard and Poor Corporation, 1993, *Standard and Poor's Register of Corporations, Directors and Executives* (Standard and Poor, New York).
- U.S. Department of Commerce, Patent and Trademark Office, 1990, *Technology Profile Report: Genetic Engineering, 1 / 1963–6 / 1989* (USPTO, Washington, D.C.).
- Venture Economics, 1988, *Guide to European Venture Capital Sources* (Venture Economics, London).
- , 1989, *Venture Capital Performance* (Venture Economics, Needham, Mass.).
- , 1992, *Pratt's Guide to Venture Capital Sources* (Venture Economics, New York).
- Weisbach, M. S., 1988, Outside directors and CEO turnover, *Journal of Financial Economics* 20, 431–460.
- Williamson, O. E., 1983, Organization form, residual claimants, and corporate control, *Journal of Law and Economics* 26, 351–366.