

Insider reputation and selling decisions: the unwinding of venture capital investments during equity IPOs

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Abstract

Data on selling by venture capitalists during the IPOs of their portfolio companies are used to examine the relation between insider selling decisions and reputation. We hypothesize that, in deciding whether to sell, venture capitalists balance the costs of continued managerial/monitoring involvement against the adverse reaction to selling. Further, they facilitate unwinding of investment positions by developing reputations for not selling overpriced shares. Evidence on the timing of IPOs and selling decisions of venture capitalists confirms the importance of reputation as a determinant of the organization of the venture capital market and as a factor affecting insider selling decisions. © 1998 Elsevier Science B.V. All rights reserved.

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1. Introduction

Both theory and evidence suggest that market participants seek protection from opportunity losses arising from trades against informationally advantaged insiders.

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Costs of information asymmetry include higher capital costs, wider bid-ask spreads, and reduced liquidity. When insiders must disclose in advance that they are selling, such as in a public offering, concern with information asymmetry can reduce their ability to sell, even when they are not acting opportunistically. The increase in average return that compensates outsiders for trading in a market where insiders also trade leads to underinvestment, as does the negative stock price reaction to equity issue announcements.¹ Such costs provide incentives to design institutional structures that lessen information asymmetry.

In this paper, we focus on insider selling during public issues, and particularly on secondary sales by venture capital investors during the initial public offerings (IPOs) of their portfolio companies. Venture capital investors are insiders that perform monitoring functions of their portfolio companies and often are represented on the boards of directors.² In deciding whether to sell in the IPO, we hypothesize that venture capitalists balance the costs of continued involvement and ownership against the adverse market reaction to insider selling. We also expect that venture capitalists will seek to limit the adverse reaction by developing reputations for selling shares that are not overpriced. Such a reputation contributes to the ability of the venture capitalist to profitably redeploy capital and advisory skills.³

Our evidence confirms the importance of reputation as a factor affecting the selling decision and as a determinant of the organization of the venture capital market. We find that ongoing ownership interests of venture capitalists restrain their abilities to redeploy advisory talent to other ventures. To expedite redeployment and unwinding of investments, companies with venture capital involvement are brought to market earlier than other companies.⁴ Although most venture capital investors do not sell during the IPO, we find that both their holdings and managerial involvement in the portfolio company decline thereafter. Those who do sell have well-established reputations as evidenced by several measures. Further, we find that venture capitalists with established reputations refrain from selling

¹ The negative reaction with respect to IPOs, though not observable, can influence the decision of whether to go public, and, if so, when and how.

² Sahlman (1990) reports that most agreements between venture capital investors and their portfolio companies require board representation.

³ In practice, the extent of insider selling is an outcome of negotiation with the underwriter. Consistent with our hypothesis, industry participants report that selling is more likely to be agreed to when the issue is expected to be underpriced and where concern about an adverse price reaction to selling is slight.

⁴ Gompers (1996) provides an alternative, non-mutually exclusive, reason for the early timing of IPOs by firms with venture capital investors: Since their ability to raise additional capital is tied to the demonstration of success with earlier funds, venture capitalists have an incentive to bring portfolio companies public earlier than would be optimal for the companies.

unless the IPO is underpriced. Our results suggest that venture capitalists are insiders who recognize the value of maintaining reputations with underwriters and secondary market investors for not acting opportunistically.

Our focus on selling during the IPO is different from the focus of Gompers and Lerner (1997), who examine venture capitalist decisions to distribute shares to limited partners of their venture capital funds after the IPO. They find that venture capitalists time distributions to exploit temporary overpricing and that the market underreacts to distributions, evidencing a degree of market inefficiency. In contrast to distributions, which are unannounced private transactions, IPOs are highly visible, announced in advance via prospectus, and subject insiders and underwriters to legal liability under Rule 12 of the Securities Act of 1933.

Clearly, decisions to sell in the IPO or distribute shares after the IPO are not independent. A venture capitalist might refrain from selling if opportunities to distribute higher valued shares later were expected to be attractive. The interrelationship and opportunity to time distributions reinforce the negative signal of a decision to sell during the IPO and add to the value of developing a reputation for not selling overvalued shares.

Analysis of selling by venture capital investors provides several insights: First, since venture capitalists are identifiable insiders who are repeat players in the IPO market, their selling decisions can be used to test inferences about the determinants of insider selling generally, and about the role of reputation in reducing the cost of information asymmetry. Second, the analysis enhances our understanding of relations between venture capitalists and investors who supply funds to them, and of relations between venture capitalists and their portfolio companies. Third, since public sale of shares would appear to be a simple way to establish investment value and liquidate the holdings of a venture capital investor, it is useful to consider why selling during IPOs is not more prevalent.

In Section 2, we provide essential background on the organizational structure of venture capital investors and the workings of the venture capital market. Testable implications of the reputation hypothesis are developed in Section 3. Section 4 describes the database and Section 5 contains our empirical findings.

2. Venture capital investing

Most venture capital investors are organized as limited partnerships where the venture capitalist serves as general partner and is responsible for investment decisions, monitoring and liquidation. Venture capitalists are repeat participants in the market and specialists in early stage financing. Typically the venture capitalist has expertise in a rapidly evolving area such as electronics or medical technology. Success depends on the ability to select and nurture projects, skill in deciding whether to withhold incremental funds from projects that do not perform up to

expectations, and ability to time liquidation so that overall returns are maximized. Since their expertise, relationships, and reputation are specific to early stage ventures, marginal productivity is higher if resources of the venture capitalist are redeployed as portfolio companies mature.

Commitments by the venture capitalist of capital and advisory talent are not easily separable. The return to effort is realized primarily through liquidation of the partnership's equity position. Venture capitalists seldom commit capital without becoming involved actively in management. They normally want to withdraw capital when active involvement ends. Conversely, as long as the partnership continues to have a substantial capital investment in a company, the venture capitalist cannot easily free-up its advisory service resources for allocation to other projects. Maintaining a large ownership share can obligate the venture capitalist to an ongoing monitoring role, detracting from ability to focus on other projects that appear to offer higher returns.⁵ To warrant continuing investment, the expected holding period return must be sufficient to compensate for both the capital investment of the partnership and the opportunity cost of continuing effort by the venture capitalist.⁶

Because commitments of capital and advisory service are tied, position unwinding is an important aspect of investment strategy. Organizational structures and contractual arrangements of venture capital investors reflect the tie. Typically limited partnerships are organized to last for 10 years, with cash take-down during the first 2 to 5 years, during which funds are paid in by the limited partners and invested. The finite life provides additional motivation to sell during the IPO, possibly even if the expected return from continued involvement would be high. Accordingly, the life of a limited partnership generally can be extended to achieve full value of the investments.⁷

⁵ Sahlman (1990) notes that venture capital limited partnership agreements often contractually obligate the general partner to commit a certain amount of effort to the investments of the partnership. In addition, a fiduciary relationship may be deemed to exist between an insider/blockholder and shareholders.

⁶ This does not imply that aftermarket holding period returns of IPOs with continuing investment will exceed cost of capital. The relevant comparison for the venture capitalist is between the conjectural IPO price if the partnership were to sell and the aftermarket price attainable by the partnership if it continues to be involved with the enterprise.

⁷ Typically, a two-thirds majority vote of the limited partners is required for each decision to extend the life and each extension is for an interval of 1 or 2 years. In the event of an extension, partnership agreements typically provide for renegotiation of fees paid to the general partner. The bases for renegotiation are that monitoring an established company is less burdensome than at an earlier stage of the venture and that a reduction of compensation can discourage the general partner from proposing to extend the life of the partnership unless expected value creation from continued monitoring is sufficiently positive. If a portfolio company has not developed a record sufficient to warrant an IPO, the shares can be transferred to a liquidating trust and the venture capitalist can withdraw from active participation in management.

The investment choices and the IPO timing decisions of portfolio companies are consistent with the efforts of venture capital fund managers to quickly develop viable markets for the stock. Barry et al. (1990) find that IPOs with venture capital backing tend to involve firms with less well-established earnings records than other IPOs.⁸ Megginson and Weiss (1991) find, for a sample matched by industry and offering size, that firms with venture capital backing undertake IPOs at younger ages than do other firms. Gompers (1996) compares IPOs backed by young vs. well-established venture capitalists and finds that those backed by young venture capitalists are brought to market at earlier ages and are more underpriced. Gompers attributes the difference to ‘grandstanding’ benefits that are important to young venture capitalists but not established ones. Our view is that the value of establishing ready markets for the stocks of portfolio companies is augmented by gains the venture capitalist can realize by freeing up its advisory service resources.

In discussions, venture capitalists indicate that they prefer to sell as much of their position as possible in the IPO since remaining shares cannot be traded for several months.⁹ The extent of selling depends on the interaction of several factors. The underwriter often limits or prohibits selling due to a concern that selling by the investor could adversely affect the issue price. However, timing of the IPO and choice of underwriter can be influenced by the venture capitalist. Although most IPOs with venture capital backing do not include secondary sales by venture capital investors, we find a material fraction where the investors sell substantial percentages of their holdings.

3. Analytical framework

A venture capitalist may want to sell during the IPO of a portfolio company either because alternative opportunities offer higher risk-adjusted returns, or because of a belief that the shares would be overvalued by the market.¹⁰ We expect outside investors to recognize the potential for overvaluation and to react negatively to the venture capitalist’s decision to sell. Since outside investors

⁸ They attribute this to the fact that venture capital investors tend to specialize in industries where it is common for companies to go public with negative earnings.

⁹ Except for sales during the offering, underwriting agreements usually prevent sale of shares by insiders, typically for 6 months, but sometimes up to 2 years, after the offering. Shares cannot be distributed to limited partners during this ‘lock-up’ period.

¹⁰ Lerner (1994) provides evidence that experienced venture capitalists are able to time IPOs to coincide with market value peaks, but does not examine selling by the venture capitalist. Brav and Gompers (1997) find no evidence that venture capital backed IPOs underperform the market during the 5 years after the IPO.

cannot distinguish between overvaluation and other motives for selling, the IPO issue price must be low enough so that, on average, returns to outside investors are at least normal. Systematic underpricing can result for a variety of reasons, including the possibility that the underwriter and/or venture capital investors intentionally underprice to avoid damage to reputation and the possibility of a shareholder lawsuit if the stock price declines after the IPO.¹¹

The magnitude of the (unobservable) negative price reaction to selling by the venture capitalist depends on several factors. In broad terms, they include the potential for overvaluation by the market, the quality of third party (underwriter) certification of value, and the reputation of the venture capitalist. Thus, venture capitalists benefit if they can develop reputations sufficient to reduce concerns with information asymmetry.

The relation between venture capital ‘backing’ (i.e., continued ownership of shares) and IPO underpricing is examined by Megginson and Weiss (1991). Drawing on the underwriter certification model of Booth and Smith (1986), they develop hypotheses concerning a similar certification role for issues backed by venture capital. They find venture capital backing is associated with reduced IPO underpricing and narrower underwriter spreads and conclude that continuing involvement of the investor lowers the cost of going public.

Rather than focusing on venture capital backing, we examine the relation between underpricing and the selling decision of the venture capitalist. Both Barry et al. (1990) and Megginson and Weiss (1991) identify ongoing investments by venture capital investors as a device that limits opportunism. Barry et al. contend that by maintaining equity positions after the IPO, venture capitalists bind themselves to future stock performance and provide assurance of continued monitoring. Megginson and Weiss hypothesize that retention of holdings acts as a bond that enables venture capital investors to certify value. While we accept the validity of the certification and monitoring arguments, a premise of our analysis is that retention of ownership is costly for the venture capitalist. Our analysis is more in the spirit of Sahlman (1990), who views the relation between the general and limited partners as a repeated game. The limited partners, the underwriter, and possibly other investors recognize that reputational capital of the general partner that is specific to the venture capital industry (and arises naturally from the process of organizing venture capital partnerships) can function as a bond. In the context of our analysis the bond supplants the need to retain an equity position in the portfolio company after the IPO.¹²

¹¹ For the sample of IPOs with venture capital backing in this study, the *Wall Street Journal* reported four where issuers and underwriters were sued for failing to disclose material information to investors. In three of the IPOs, a venture capital investor presided on the board and was among the defendants.

¹² Megginson and Weiss (1991) acknowledge the value of reputation but do not examine the ability of venture capitalists to substitute reputation for ongoing ownership.

In summary, we hypothesize that venture capitalists balance the costs of continued monitoring involvement against the adverse market reaction to insider selling, and seek to limit the reaction by developing reputations for selling shares that are not overpriced. The hypothesis gives rise to the following four testable implications:

1. Companies with venture capital investors are brought to market at an earlier stage of development than other companies.
2. Ownership positions of venture capital investors are reduced substantially after a company goes public. Monitoring responsibilities will decline correspondingly.
3. The likelihood of selling during the IPO depends positively on venture capitalist reputation and underwriter certification and negatively on the potential for overvaluation.
4. Venture capitalists with established reputations seek to maintain their reputations by selling shares in IPOs only if they perceive them not to be overpriced.

The first and second implications follow from the objective of a venture capitalist to redeploy advisory service resources when the return from continuing to monitor a company is below opportunity cost and by the need to liquidate existing investments to free up resources that are specific to early stage development. The third implication follows from the information asymmetry problem between insiders of issuing firms and outside investors, and from the declining return to advisory service effort of the venture capitalist as the portfolio company matures. The final implication concerns the relation between venture capitalist reputation and underpricing. Venture capitalists with established reputations are expected to forego short-run profits in order to maintain and enhance their reputations.¹³

4. Data

We test the hypothesis using a sample of 2634 IPOs that occurred between 1979 and 1990. The sample was identified using the *Directory of Corporate Financing* and the SEC Registered Offering Statistics tape.¹⁴ Stock price informa-

¹³ A finding that IPOs that involve selling by venture capitalists with established reputations are more underpriced than others does not mean that such investors are worse off than others. By refraining from overpricing, venture capitalists are expected to gain the ability to sell shares during IPOs of less well-established companies, enabling them to redeploy advisory service talent sooner.

¹⁴ The Registered Offering Statistics tape was discontinued by the SEC at the end of 1988.

Table 1

Frequency distributions of 2634 common equity IPOs from 1979 to 1990, including 497 with venture capital backing and 133 with secondary offerings by the lead venture capital investor

Year	Total number of IPOs	Number of IPOs with venture capital backing	Number of IPOs where the lead investor sells shares	Percent of venture capital backed IPOs where the lead investor sells shares
1979	43	5	1	20
1980	100	15	4	27
1981	272	30	7	23
1982	85	15	3	20
1983	488	94	26	28
1984	222	37	5	14
1985	206	41	9	22
1986	447	80	19	24
1987	309	75	20	27
1988	144	32	12	38
1989	169	35	12	34
1990	149	38	15	39
Total	2634	497	133	27

IPOs are identified using the Registered Offering Statistics tape of the US Securities and Exchange Commission and the *Directory of Corporate Financing*. Information on venture capitalists and their positions is from the prospectus of the issuing firm, *Venture Capital Journal* and *Pratt's Guide to Venture Capital Sources*.

tion is from the Center for Research on Securities Prices (CRSP) tapes. Market adjusted stock returns are computed using the CRSP equally-weighted return index. Companies with venture capital backing were identified using the annual report issues of *Venture Capital Journal*. Extent of venture capital holdings, identities of selling shareholders and affiliations of directors were collected from prospectuses. Information on venture capitalists is from *Pratt's Guide to Venture*

Notes to Table 2:

* * Significant at the 5% level.

The table is constructed using data for each IPO and includes multiple references to the same venture capitalist, both as lead and nonlead. Information on venture capitalist founding year and portfolio size is from *Pratt's Guide to Venture Capital Sources* annual reports. Ownership and directorship information is from the issue prospectus. The prospectus normally identifies the venture capitalists who are involved, but not the particular limited partnership(s) under management of the venture capitalist. Thus, ownership stakes of partnerships of the same venture capitalist are aggregated. The US total venture capital pool is total capital committed to the venture capital industry, less the value of funds that are liquidated. Information for 1979 to 1984 is from Perez (1986) and information for 1985 to 1990 is from *Venture Capital Journal* (1990) and Bonnanzio (1991).

Table 2

Characteristics and equity ownership stakes of venture capital investors for a sample of 497 venture capital backed companies that made IPOs from 1979 through 1990 (medians and Mann–Whitney Z-values in parentheses)

Variable	All venture capital investors	Comparison between lead and non-lead investors		
		Lead investors	Non-lead investors	Difference in means t-statistic (Z-value)
Number of venture capitalists	1299	497	802	
<i>Characteristics of venture capitalists</i>				
Total number of IPOs in which the venture capitalist was involved (1979 to 1990)	11.3 (8)	12.0 (9)	10.8 (8)	2.10 * * (2.23) * *
Funds under management by the venture capitalist before the IPOs (millions of US\$)	149.6 (95)	168.7 (100)	137.6 (91)	2.81 * * (1.39)
Funds under management by the venture capitalist as a percent of US total venture capital pool	0.69% (0.50%)	0.79% (0.56%)	0.64% (0.45%)	3.63 * * (2.55) * *
Age of the venture capitalist before the IPO (years)	12.6 (11)	12.8 (12)	11.5 (9) (9)	2.60 * * (2.76) * *
<i>Equity ownership stakes</i>				
Pre-IPO percent of equity held by each venture capitalist	11.2% (8.3%)	17.3% (14.5%)	7.3% (6.4%)	15.97 * * (18.94) * *
Post-IPO percent of equity held by each venture capitalist	7.9% (6.1%)	12.1% (10.1%)	5.3% (4.8%)	16.28 * * (18.44) * *
Percent of venture capitalists who held directorships in issuing companies	57.5% (100%)	80.5% (100%)	43.3% (0%)	14.91 * * (13.18) * *

Table 3

Venture capital investor ownership and directorships for a sample of 497 venture capital backed IPOs from 1979 through 1990 (medians and Mann–Whitney Z-values in parentheses)

Variable	All venture capital backed IPOs	When lead investor sells shares	When lead investor does not sell shares	t-Statistic for difference in means (Z-values)
Number of observations	497	133	364	
Number of venture capitalists per issue	2.6 (2.0)	2.5 (2.0)	2.7 (2.0)	0.91 (1.04)
<i>Ownership by all venture capitalists</i>				
Percent of pre-IPO shares held	29.2% (26.1%)	28.2% (24.7%)	29.5% (26.7%)	0.70 (0.19)
Percent of post-IPO shares held	20.7% (18.0%)	17.7% (15.2%)	21.8% (19.3%)	3.16 * * (2.46) * *
Shares sold as a percent of shares held	6.0% (0.0%)	20.0% (16.2%)	0.9% (0.0%)	13.96 * * (18.69) * *
Shares sold as a percent of shares issued	4.2% (0.0%)	12.7% (9.5%)	1.1% (0.0%)	11.20 * * (17.48) * *

Ownership by lead venture capitalist

Percent of pre-IPO shares held	17.3% (14.5%)	18.3% (16.0%)	16.9% (14.2%)	1.05 (1.94) *
Percent of post-IPO shares held	12.1% (10.1%)	11.2% (9.8%)	12.4% (10.4%)	1.57 (0.92)
Shares sold as a percent of shares held	5.5% (0.0%)	20.4% (16.2%)	0.0% (0.0%)	
Shares sold as a percent of shares issued	2.4% (0.0%)	8.9% (7.2%)	0.0% (0.0%)	

Directorships of venture capitalist

Number of an issuer's directorships held	1.5 (1.0)	1.4 (1.0)	1.6 (1.0)	2.34 * * (2.45) * *
Percentage of issuer's directorships held	25.4% (20%)	23.0% (20%)	26.3% (22%)	1.85 * (1.73) *

* Significant at the 10% level.

* * Significant at the 5% level.

Venture capital ownership and directorship information is derived from the issuer prospectus. The lead venture capital investor is defined as the largest shareholder among venture capital investors. If two or more hold equivalent positions, the one with board representation is classified as lead.

Capital Sources. We identified 497 IPOs backed by venture capital. These issues represent 321 different venture capitalists and an average of 2.61 for each IPO.¹⁵

Issues with venture capital backing were classified further on the basis of whether the IPO included a secondary sale by the lead venture capital investor. A venture capitalist is designated as ‘lead’ if it holds the largest equity position of any venture capitalist. If two or more hold equivalent positions, the one with representation on the board of directors is designated as lead.¹⁶ Since lead investors have large equity positions and participate actively in monitoring, their decisions to sell are expected to be more informative than decisions by non-lead investors. Of the issues with venture capital backing, 26.7% include secondary sales by the lead investor. Table 1 shows the IPO frequency distributions over time for the sample and subsamples. The year of highest activity, 1983, accounts for 18.5% of the sample, 18.9% of those with venture capital backing and 19.5% of those with selling by the lead investor.

Table 2 compares characteristics and shareholdings of lead and non-lead venture capital investors. Lead investors are older, larger, involved in more IPOs and more likely to hold directorships. The larger ownership stakes and higher levels of board involvement of lead investors suggest that their selling is more likely to convey information than is selling by non-lead investors.

For IPOs with venture capital backing, Table 3 documents the extent of investor involvement with the issuer. Average share of ownership by the investor declines by 8.5 percentage points around the IPO. The decline, although partly a function of the increase in shares outstanding, is significantly larger when the lead investor sells. On average, lead investors who sell, reduce their holdings by 20.4% and sell 8.9% of the shares offered. The monitoring role is evident from the fact that venture capital investors account for 25.4% of issuing firm directors

5. Empirical analysis

5.1. *Timing of the IPO*

Our hypothesis implies that IPOs with venture backing involve companies that are at earlier stages of development than other IPOs. Bivariate results in Table 4 are consistent with the hypothesis. On average, issuers with venture backing have been incorporated only half as long as others. Both the mean and median ratios of revenue to assets, our primary financial measure of firm maturity, are significantly

¹⁵ Our process is similar to that of Barry et al. (1990) and yields a similar number of observations for each sample year. In contrast, we classify investors as venture capitalists only if they are identified as such in *Pratt's Guide to Venture Capital Sources*. The difference in approach is not material since we focus on the venture capitalist with the largest ownership position.

¹⁶ Our results do not change materially if we limit the definition of lead investor by requiring board representation.

Table 4

Comparisons of IPOs with and without venture capital backing for the period from 1979 through 1990 (medians and Mann–Whitney Z-values in parentheses, numbers of observations in brackets)

Variable	IPOs with venture capital backing	IPOs without venture capital backing	t-Statistic for difference in means (Z-value)
Issue proceeds (millions of US\$)	22.9 (17.3) [497]	26.6 (7.3) [2137]	1.74 * (13.48) **
Number of years from issuer incorporation to IPO	7.5 (5.0) [497]	15.0 (5.0) [2137]	10.97 ** (1.35)
Prior year revenue of issuer (millions of US\$)	40.0 (14.4) [496]	62.2 (10.7) [1668]	2.67 ** (3.30) **
Prior year book value of assets of issuer (millions of US\$)	39.8 (14.4) [497]	77.2 (6.9) [1657]	2.09 ** (7.89) **
Ratio of issuer revenue to assets	1.1 (1.1) [496]	1.77 (1.4) [1582]	5.36 ** (6.83) **
Underwriter ranking for IPO of issuer	7.0 (7.5) [473]	5.5 (5.5) [1708]	14.93 ** (11.59) **

* Significant at the 10% level.

** Significant at the 5% level.

Issue proceeds and issuer characteristics are obtained from the Underwriter ranking is the Carter and Manaster (1990) ranking of the underwriter, where 9 indicates highest prestige and 0 represents lowest.

lower for IPOs with venture capital backing. The table also contains suggestive evidence that underwriters performs a certification function. Using the Carter and Manaster (1990) ranking of the underwriter to proxy for reputation, the mean and median rankings are significantly higher for IPOs with venture capital backing. The higher ranking is consistent with certification being more important for IPOs of companies lacking well-established track records.

Results shed new light on the findings of Barry et al. (1990) and Megginson and Weiss (1991) concerning differences between IPOs with and without venture capital backing. Barry et al. compare earnings-to-offer-price ratios of venture-backed and non-venture-backed IPOs. They find that venture-backed IPOs have lower earnings-to-price ratios than other IPOs (in fact, the average for venture-backed IPOs is negative 1.54%), but that the industry of the issuer accounts for much of the difference. They conclude that venture capital investors concentrate on industries where companies go public without established records of positive earnings. Megginson and Weiss find results similar to ours, but for a sample of IPOs that is matched by industry and offering size. They find venture-backed IPOs are younger and have lower revenues and assets than do matched IPOs.¹⁷

Nor can results in Table 4 be explained fully by the grandstanding hypothesis of Gompers (1996). In particular, the difference in mean age at the time of the IPO of companies backed by venture capital and those that are not is too large. Gompers reports that 4.5 years is the average age of issuers backed by young venture capitalists and 6.7 years is the average of those backed by established venture capitalists. The average for our sample of IPOs with venture backing is 7.5 years. None of these is close to the 15.0 year average age that we find for issuers without venture capital backing.

5.2. Ownership and managerial / monitoring involvement of venture capital investors after the IPO

Megginson and Weiss (1991) hypothesize that venture capital investors certify the IPO issue price by maintaining ownership in the company. Barry et al. (1990) suggest that retention of ownership provides both a signal of value and an ongoing commitment to monitor. To investigate the commitment to ongoing monitoring, they examine holdings approximately 1 year after the IPO. They find that holdings 1 year later have declined by 28% and that the number of seats on the board remains high. From these results they infer that venture capitalists are long-run investors who commit to provide ongoing monitoring. They dispute the claim of Gladstone (1989) that the IPO is part of a venture capital exit strategy.

¹⁷ In Table 4, we do not control for industry of the issuer since industry focus is a choice available to the venture capitalist. When we control in a manner similar to Megginson and Weiss, results are similar to those in Table 4. Thus, our evidence is inconsistent with the view that venture-backed firms undertake IPOs earlier simply because venture capitalists target industries that traditionally are brought to market earlier.

A period of 1 year may not be long enough to reveal an exit strategy, particularly in light of restrictions on distributing or selling shares for several months after the IPO. In Table 5, we examine long-term involvement of venture capital investors with portfolio companies. For this purpose we use proxy statements that are available through Lexis beginning with 1989. For our sample of companies with venture backing, we selected the earliest available statement for a period at least 3 years after the IPO. We located statements for 106 of the IPOs, including 24 where the lead investor sold shares.

We use long-run changes in share ownership and directorships to examine the hypothesis that venture capitalists reduce equity positions to facilitate redeployment of resources. Table 5 shows the decline in ownership interests of lead investors several years after the IPO. In our subsample, only 12.3% still are listed in the proxy statements as blockholders. The average reported holding is only 1.4% of shares outstanding, compared to 12.1% immediately after the IPO. For the 13 companies with continuing significant investments, average ownership remains high at 11.2%. There are corresponding changes in the monitoring involvement of lead investors. The percentage with directorships is down from 80.5 at the time of the IPO to 37.7 several years later. Of those companies with continuing significant ownership, 76.9% continue to have the investor represented on the board. This is significantly higher than the 32.3% level for firms where the investor no longer is identified as a blockholder.

Table 5

Long-term involvement of lead venture capital investors with their portfolio companies (based on a subsample of 106 venture capital backed issuing companies with proxy statements available from Lexis)

Variable	Current position of lead investor		Total
	Still owns stock	No longer owns stock	
Number of issuing companies	13	93	106
Ownership share of lead investor	11.2%	0.0%	1.4%
Percent of lead investors with directorships	76.9%	32.3%	37.7% * *
Percent of directorships held by lead investor	13.6%	4.9%	6.0%
Percent of directors who are associated with the lead investor and who individually own stock in the portfolio company	90.0%	93.3%	92.5%

* * Difference between groups significant at the 5% level ($\chi^2_1 = 9.71$). Other comparisons in the table are not tested.

The table is constructed using information from proxy statements available on Lexis. The database was searched for all proxy statements by firms in our sample that undertook venture capital backed IPOs. To allow sufficient time for investors to liquidate their positions, the data are from the first available proxy statement at least three years after the IPO.

Findings in Table 5 are not surprising in light of the (endogenously determined) finite life spans of venture capital limited partnerships. More significant is the finding of a substantial reduction in directorships. Although the decline is not as severe as for ownership, in 93.3% of the cases where a director affiliated with the lead venture capitalist remains on the board, the director is identified individually in the proxy statement of the company as a significant stockholder. Results are consistent with our view that venture capital commitments of advisory services and investment capital are not easily separable and that venture capitalists reduce equity holdings to redeploy advisory service resources.

5.3. *Selling of shares during the IPO by lead venture capital investors*

We use differences in means and a multivariate tobit specification to test the relation between the decision to sell and the costs of delaying sale that are associated with information asymmetry. Selling is more likely for issues of companies with established performance records, where the underwriter's reputation helps to certify value, and where the lead investor has an established reputation. Bivariate results are reported in Table 6. Lead venture capitalists who sell tend to have served as lead investors in more projects and to be older than those who do not. In addition, issues by older companies with higher levels of revenue-to-assets are more likely to include secondary sales by the lead investor, as are issues underwritten by highly ranked investment bankers.

Regardless of venture capital involvement, the underwriter is more likely to allow a secondary offering when the issuer has an established track record. Accordingly, our concern is with voluntary selling by the lead investor and not merely the inclusion of a secondary offering. As one indication of the voluntary nature of the selling decision, we examine the relation between selling by lead investors and selling by management and officers, excluding the venture capitalist. Sahlman (1990) reports that venture capital financing agreements typically enable venture capital investors to sell in IPOs whenever managers and officers do so. Yet in 121 of the 239 cases in our sample where managers and officers sold, the lead investor did not. Conversely, in only 15 of 258 cases where the lead investor sold, managers and officers did not. This result suggests that lead investors often voluntarily refrained from selling during the IPO.

We use multivariate tobit to examine the relation between selling and lead investor reputation, controlling for the track record of the issuer and the reputation

Notes to Table 6:

* Significant at the 10% level.

** Significant at the 5% level.

Issuer information is from the IPO prospectus. Venture capitalist information is from the prospectus, *Venture Capital Journal*, and *Pratt's Guide to Venture Capital Sources*. Underwriter reputation is defined as the Carter and Manaster (1990) ranking of underwriters, where 9 indicates the highest level of prestige and 0 represents the lowest level.

Table 6

Comparisons of venture capital backed IPOs with and without selling by lead venture capital investors (medians and Z-values in parentheses, numbers of observations in brackets)

Variable	When lead investor sells shares	When lead investor does not sell shares	t-Statistic for difference in means (Z-value)
Number of years from issuer incorporation to IPO	9.9 (7.0) [133]	6.6 (4.0) [364]	2.9 * (5.01) **
Preceding year's revenue of issuer (millions of US\$)	53.8 (20.4) [133]	35.0 (12.4) [363]	1.50 (4.62) **
Book value of assets of issuer (millions of US\$)	38.5 (15.4) [133]	40.2 (14.2) [364]	0.15 (1.44)
Issuer revenue to assets	1.4 (1.4) [133]	1.0 (0.9) [363]	5.63 * (6.18) **
Number of deals where the investor served as lead	3.3 (2) [133]	1.2 (1) [364]	5.82 * (10.27) **
Age of the lead investors before the IPO (years)	14.1 (12) [133]	12.4 (12) [364]	1.84 * (1.94) *
Underwriter ranking for IPO	7.3 (7.5) [130]	6.9 (7.5) [343]	2.26 * (1.20)
Holding period of earliest reported venture capital investor	2.58 (2.58) [105]	2.41 (2.42) [169]	0.98 (1.21)

Table 7

Tobit models of the decision of the lead venture capital investor to sell shares in the IPO of a portfolio company

Variable	(1)	(2)	(3)
Intercept	−0.55 (5.48) ^{**}	−0.51 (5.32) ^{**}	−0.46 (4.89) ^{**}
Proceeds of issue (billions)	0.26 (0.26)	0.26 (0.27)	0.17 (0.17)
Lead investor directorship	−0.032 (0.58)	−0.050 (0.92)	−0.043 (0.78)
Market run-up	0.312 (1.79) [*]	0.312 (1.83) [*]	0.327 (1.88) [*]
Years since incorporation of issuer	0.004 (2.01) ^{**}	0.003 (1.97) ^{**}	0.004 (2.07) ^{**}
Ratio of issuer revenue to assets	0.11 (4.42) ^{**}	0.10 (4.11) ^{**}	0.11 (4.30) ^{**}
Age of lead investor (years)	0.005 (2.19) ^{**}		
Number of deals where lead investor is lead		0.026 (4.42) ^{**}	
Index of lead investor reputation			0.096 (3.66) ^b
Underwriter ranking	0.017 (1.61)	0.018 (1.71) [*]	0.015 (1.48)
<i>N</i>	497	497	497
Log-likelihood	−183 ^{**}	−176 ^{**}	−179 ^{**}

^{*} Significant at the 10% level.

^{**} Significant at the 5% level.

Independent variables include issue proceeds in logs of billions, market run-up over the 90 market days before the IPO, an indicator for directorships held by the lead investor, the issuer's revenue-to-assets ratio, the Carter–Manaster ranking of the underwriter, and a venture capitalist reputation measure. Underwriters without reported Carter–Manaster rankings are assigned a value of zero. Venture capitalist reputation is measured alternatively as: age before the offering, number of deals involved in as lead over the twelve years of the study, and an index constructed as the average standardized value of both variables.

The dependent variable is the ratio of shares sold by the investor to shares held by the investor. The sample includes 497 IPOs with venture capital backing (absolute *t*-values in parentheses).

of the underwriter. Results are reported in Table 7. The dependent variable is the ratio of shares sold by the lead investor to shares held by the investor.¹⁸ We use three measures to reflect lead investor reputation: age, number of deals in which

¹⁸ We also tested the hypothesis using shares sold by the investor as a percent of shares issued in the IPO, and using a logit specification where the binary dependent variable is assigned the value of one if the lead investor sold any shares during the IPO or where the lead investor sold at least 5% of the issue. Results are similar in all cases and are available from the authors upon request.

Table 8

Tests of differences in mean and median market adjusted initial returns for issues grouped by the reputation of the lead venture capital investor and by whether the lead investor sells during the IPO (medians in italics, *t*-statistics in parentheses and numbers of observations in brackets)

	Investors with established reputations	Investors without established reputations	<i>t</i> -Statistic for difference in means	Mann–Whitney Z-statistic for medians
All issues	7.2% 3.1% (7.93) * * [248]	9.3% 3.8% (8.78) * * [249]	1.53	1.37
Issues where venture capital investors sell	11.6% 7.1% (7.19) * * [67]	7.4% 3.7% (3.59) * * [66]	1.58	1.27
Issues where venture capital investors do not sell	5.1% 2.2% (4.86) * * [181]	9.8% 3.9% (8.01) * * [183]	2.92 * *	2.62 * *
<i>t</i> -Statistic for difference in means	3.37 * *	0.99		
Mann–Whitney Z-statistic for medians	3.11 * *	0.58		

* * Significant at the 5% level.

Venture capitalist reputation is measured as a binary classification of an index constructed as the average of the standardized values of age before the offering and number of deals involved in as lead over the twelve years of the study. Market adjusted returns are measured from issue price to first aftermarket closing price. The CRSP equally weighted index is used as a proxy for the market.

the venture capitalist is involved as lead, and an index constructed as the equally weighted average of the standardized values of both.¹⁹ Results in Table 7 are consistent with the bivariate results in Table 6. Selling by the lead investor is more likely when the investor has an established reputation. The track record of the issuer as reflected by age and revenue-to-assets also significantly affects venture capitalist selling. The effect of underwriter ranking, while positive, is only marginally significant.

In part, our expectations with respect to the selling decisions of venture capital investors apply to insiders more generally. As noted above, secondary sales in conjunction with IPOs are more likely for companies that are well established and

¹⁹ The index value is calculated as follows: index of lead investor reputation = 0.5 (Age of lead investor – Mean age) / σ_{age} + 0.5 (Number of deals – Mean number) / σ_{deals} .

when the underwriter has an established reputation. These relationships are broadly consistent with our view that information asymmetry affects the extent of insider selling and that the issuer's track record and underwriter reputation mitigate concerns about opportunism. Our evidence on the decision to refrain from selling even when other insiders sell provides more direct support for our hypothesis concerning the importance of venture capitalist reputation, as does the finding that venture capitalist reputation affects the extent of selling.

5.4. *IPO underpricing and venture capital investor reputation and selling decisions*

The fourth implication of our hypothesis is tested by comparing underpricing of IPOs grouped by lead investor reputation and whether the investor sells. For this

Table 9

Ordinary least squares regression of initial returns on indicators of lead venture capital investor reputations and selling decisions (*t*-values in parentheses)

Variable	Coefficient (<i>t</i> -statistic)
Intercept	12.6 (5.36) * *
Proceeds of issue (billions)	0.10 (2.77) * *
Years since incorporation of issuer	−0.90 (−1.27)
Ratio of issuer revenue to assets	1.45 (1.67) *
Lead investor reputation (indicator)	−4.56 (−2.82) * *
Lead investor sells (indicator)	−3.46 (−1.43)
Lead investor is reputable and sells (indicator)	10.10 (3.20) * *
Underwriter ranking	−0.90 (−2.71) * *
<i>N</i>	497
Adj. <i>R</i> ²	0.06

* Significant at the 10% level.

* * Significant at the 5% level.

Independent variables include issue proceeds in billions, age of issuer in years, the issuer's revenue-to-assets ratio, a binary indicator of venture capitalist reputation, a binary indicator of venture capitalist selling, the interaction of both indicators and the Carter–Manaster ranking of the underwriter. Underwriters without reported Carter–Manaster rankings are assigned a value of zero, reflecting their low level of involvement in new issue underwriting. Venture capitalist reputation is measured as a binary classification of an index constructed as the average of the standardized values of age before the offering and number of deals involved in as lead over the twelve years of the study.

Table 10

Tests of differences in mean and median market adjusted one year returns for issues grouped by the reputation of the lead venture capital investor and by whether the lead investor sells during the IPO (medians in italics, *t*-statistics in parentheses, and numbers of observations in brackets)

	Investors with established reputations	Investors without established reputations	<i>t</i> -Statistic for difference in means	Mann–Whitney Z-statistic for medians
All issues	– 6.7% – 4.5% (– 1.77) * [248]	– 7.2% 0.2% (– 2.05) * * [249]	0.08	0.35
Issues where venture capital investors sell	0.6% 6.6% (0.10) [67]	2.6% 9.7% (0.34) [66]	0.21	0.53
Issues where venture capital investors do not sell	– 10.1% – 10.5% (– 2.08) * * [181]	– 9.9% – 6.3% (2.57) * * [183]	0.02	0.47
<i>t</i> -Statistic for difference in means	1.41	1.45		
Mann–Whitney Z-statistic for medians	1.83 *	1.95 *		

* Significant at the 10% level.

* * Significant at the 5% level.

Venture capitalist reputation is measured as a binary classification of an index constructed as the average of the standardized values of age before the offering and number of deals involved in as lead over the twelve years of the study. Market adjusted returns are measured from issue price to first aftermarket closing price. The CRSP equally weighted index is used as a proxy for the market.

purpose, if the value of the reputation index (based on age and involvement as lead) is greater than the average value for all investors, then the investor is classified as having an established reputation. Results based on market adjusted returns are reported in Table 8.²⁰ As expected, mean and median returns from issue date to first aftermarket closing date are highest when lead investors with established reputations sell, and lowest when they do not. For IPOs involving lead investors with established reputations, initial returns are significantly lower when the investor elects not to sell. For those involving lead investors without established reputations, the differences in initial returns are not significant. Results suggest that investors with established reputations refrain from selling unless the

²⁰ Results based on raw returns are similar.

issue is expected to be significantly and materially underpriced. For venture capitalists with less well-established reputations, selling during the IPO does not lead to an inference of greater underpricing (Table 9).

As a further test of the relation between reputation and the selling of underpriced shares, we regress initial returns on variables related to the track record of the issuing firm, proxy variables for underwriter reputation and lead investor reputation, and an indicator variable for lead investor selling. Our hypothesis is tested by including an interaction term that takes on the value of one when a lead investor with established reputation sells and zero otherwise. Again the results suggest that investors with established reputations refrain from selling in IPOs that are overpriced. All else equal, underpricing is 10.1% greater for IPOs where a lead investor with an established reputation sells than for other IPOs. In addition, the negative associations of underpricing to underwriter reputation and lead investor reputation are evidence that certification reduces underpricing.

Even though the short-run evidence is consistent with our hypothesis, the possibility remains (as suggested by the market run-up evidence in Table 7) that venture capitalists may exploit market timing opportunities by encouraging IPOs when shares are overvalued and by selling in IPOs when shares are overvalued. To check for this, we examine market adjusted returns for the year following the IPO. Our evidence, reported in Table 10, is broadly consistent with the findings of Brav and Gompers (1995, unpublished). Average market adjusted returns are significantly negative for venture capital backed IPOs. However, for IPOs where venture capital investors sell, the returns are positive and not significant. Thus, negative market adjusted returns are concentrated among issues where venture capital investors do not sell. We find no significant differences between IPOs grouped according to venture capitalist reputation. To the extent that market inefficiencies enable firms to sell during periods of overpricing, our evidence suggests that venture capitalists do not exploit the inefficiency.

6. Conclusion

The market perceives trading by insiders to be informative and reacts accordingly. For example, stock prices react negatively to large block sales and to public equity issues that reduce the fractional ownership of insiders. Conversely, stock prices react positively to share repurchase announcements and to private placements of equity. Such findings point to the existence of important market frictions that effectively raise the cost of equity capital for public firms. This paper provides evidence that these frictions sometimes are sufficient to motivate investments in reputation that can reduce the associated costs.

In particular, the unwinding of equity positions by venture capital investors is examined. Our results suggest that venture capital investors value the opportunity to begin unwinding their investments at early stages of development and that they

can develop reputations that enhance the ability to sell shares during the IPOs of their portfolio companies. We also find that third party certification by underwriters and reputation of venture capital investors reduces the extent of new issue underpricing. The results provide evidence of the important role that reputation plays in facilitating the workings of the capital markets.

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References

- Barry, C., Muscarella, C., Peavy, J. III, Vetsuypens, M., 1990. The role of venture capital in the creation of a public company. *Journal of Financial Economics* 27, 447–471.
- Bonanzio, J., April 1991, Venture pool rises 4.4% in 1990. *Venture Capital Journal*, 12–17.
- Booth, J., Smith, R., 1986. Capital raising, underwriting and the certification hypothesis. *Journal of Financial Economics* 15, 261–281.
- Brav, A., Gompers, P., 1997. "Myth or reality", the long-run underperformance of initial public offerings: Evidence from venture- and nonventure-backed companies. *Journal of Finance* 52, 1791–1821.
- Carter, R., Manaster, S., 1990. Initial public offerings and underwriter reputation. *Journal of Finance* 45, 1045–1067.
- Gladstone, D., 1989. *Venture capital investing*. Prentice-Hall, Englewood Cliffs, NJ.
- Gompers, P., 1996. Grandstanding in the venture capital industry. *Journal of Financial Economics* 42, 133–156.
- Gompers, P., Lerner, J., 1997. Venture capital distributions: Short-run and long-run reactions. *Journal of Finance*, forthcoming.
- Lerner, J., 1994. Venture capitalists and the decision to go public. *Journal of Financial Economics* 35, 293–316.
- Megginson, W., Weiss, K., 1991. Venture capitalist certification in initial public offerings. *Journal of Finance* 46, 877–903.
- Perez, R., 1986. *Inside venture capital*. Praeger Publishers, New York, NY.
- Sahlman, W., 1990. The structure and governance of venture-capital organizations. *Journal of Financial Economics* 27, 473–521.
- Venture Capital Journal, July 1990. Disbursements fall for second year as investors conserve capital. 14–22.