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Venture Capitalist Attributes and Investment Vehicles: An Exploratory Analysis

Edgar Norton

Though some casual empirical evidence exists, few empirical studies have examined venture capitalist attributes, diversification, and investment strategy. This paper provides an initial empirical examination of investment structure and how it relates to venture capitalist organizational form, size, level of diversification, and financing stage preference.

I. INTRODUCTION

As a source of risk capital, venture capital is important for the growth of private firms and for the economy. Formal venture capital firms have been around at least since the 1940's, with the founding of American Research and Development (ARD). Between ARD's investment in the fledgling Digital Equipment Corporation and venture capital-backed success stories such as Apple Computer, LOTUS, Intel, and MicroSoft, much has been written about venture capital in the popular press. But research on the financial aspects of venture capital has not occurred until relatively recently. Consequently, casual empiricism provides much of the basis for our knowledge of the venture capital process.

Venture capital is the process of raising funds, investing them in small, private growth firms, and then monitoring the investments with the goal of achieving positive risk-adjusted returns upon exiting from the investment. Venture capital is a process which involves at least three sets of players. The first set is the investors, or limited partners, in the venture capital pool, usually wealthy individuals and financial institutions such as pension funds and insurance companies. Second is the venture capitalist firm which acts as the

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pool's general partner. The venture capitalist invests the pool's funds in start-up and expanding firms. The third player is the entrepreneurial firm which needs funds to finance continued growth. Depending on the future success of the entrepreneurial firm, a fourth player may or may not later appear to provide liquidity to the venture capital pool's investors; the fourth player may be the public equity markets, another corporation, or members of the entrepreneurial team. About \$30–35 billion was under management by venture capitalists in the early 1990's (National Venture Capital Association, 1991).

Of the relatively few empirical papers written about venture capital finance, most either use data from initial public offerings or from the proprietary Venture Economics data base. Though casual empirical evidence exists, we are not aware of any empirical studies that examine venture capitalist attributes, diversification, and investment strategy. The goal of this paper is to provide an initial empirical look at investment structure and how it relates to venture capitalist organizational structure, size, level of diversification, and financing stage preferences. This analysis will provide evidence for and against several casual empiricisms and will quantify our presently limited knowledge about particular venture capitalist characteristics and investment patterns.

Casual empiricism implies the venture capital investor, rather than the portfolio firm, plays the major role in determining the pricing and structure of the investment (Sahlman, 1990). Deal structure can be quite complicated. Venture capitalists must negotiate deal terms with entrepreneurs in an effort to appropriately price the risk involved in an investment. Adding or deleting covenants and provisions in a deal changes the venture capitalist's exposure to risk; this, in turn, may affect the pricing of the venture capitalist's investment.

Due to their proprietary nature, the terms, provisions, and covenants of individual venture capital investments are not available for public analysis. Thus, an empirical study of investment structure must, by necessity, use data collected from a survey instrument. Given the inverse relationship between the level of detailed information requested and a survey's response rate, this initial study focuses on venture capitalist attributes and three main financing structures: common equity, preferred equity, and debt.

The following section of the paper reviews some of the venture capital literature and terminology that is germane to our study. Section 2 describes the survey instrument. Section 3 discusses the results from our statistical analysis of the survey responses. The results are summarized and discussed in the concluding section of the paper.

II. VENTURE CAPITAL CONCEPTS

Most venture capital firms are organized as limited partnerships with the venture capitalists as general partners and investors as limited partners (Sahlman, 1990). The typical life of a limited partnership is seven to ten years; thus investments made at the beginning of the partnership are expected to mature and return cash (or liquid securities, e.g., shares of new publicly traded firms) to the pool during this lifetime. Limited partners investing in venture capital pools know that theirs is a long-term, illiquid investment. For tax reasons, income is shunned, as any income is taxable to the partners (Sahlman, 1990). Distributing securities to the partners (e.g., following an IPO of a portfolio firm) does not create a taxable event; this only occurs when the securities are sold. Thus, with the exception of small business investment companies, investments made by limited partnerships should be structured so that returns are primarily in the form of capital appreciation rather than income.

Evidence exists that venture capitalists specialize their investments in certain industries and products (Bygrave, 1987, 1988). Venture capitalists specialize as they seek to add more than just money to their portfolio firms; they also seek to add value via their managerial and technical expertise (Norton & Tenenbaum, 1993; Sapienza & Timmons, 1989). The venture capitalist's specialized expertise can help reduce the agency cost concerns that are inherent when investing in a portfolio firm (Lerner, 1992). Sahlman reports that in 1988 the average funds under management per professional (partner or associate) in a private limited partnership averaged \$15 million per professional. For very large venture capital pools (total committed capital exceeding \$200 million), the average funds per professional was \$34 million. In addition to helping venture capitalists add value to their investments and reduce agency costs, Bygrave (1987) provides evidence that the venture capitalist's expertise provides access to information and deal networks. Access to such networks and information flows is a means whereby venture capitalists control risk in their investments (Bygrave, 1988; Norton & Tenenbaum 1993).

Another organizational form for venture capital is that of a subsidiary of a corporation. In such cases, the venture capitalist will seek growing firms that can benefit from an equity infusion and that have a potential strategic fit with a large corporation.

A small business investment company (SBIC) or minority enterprise small business investment company (MESBIC) is a venture capital pool comprised of loans from the U.S. Small Business Administration and equity contributions from venture capital investors. SBICs can borrow four dollars from the

SBA for every one dollar of stockholder equity. As a result of their interest obligations, SBICs require investments that will supply them with adequate cash flow.

Venture capitalists invest funds in start-ups, in firms that will shortly go public, and in everything in between. Early stage investments involve commitments of funds to firms with little more than a business plan (seed stage) or an initial prototype and some market studies (first stage). Expansion stage financings (second and third stage) occur as the entrepreneurial team achieves certain milestones in terms of technology, production, market acceptance, and sales growth. Bridge or mezzanine financing infuses cash to help the firm sustain market penetration while awaiting favorable developments in the IPO or acquisitions market. Some venture capitalists also invest in leveraged buyouts (LBOs). This usually involves investing in a management team with the goal of assisting an established private firm to grow to sufficient size and profitability so a public market sale of equity can occur.

Ruhnka and Young (1991) discuss how the level of risk in a venture investment depends upon the financing stage of the investment. They find that early stage investments contain a great deal more risk than latter stage deals and that the composition of the investor's risk exposure changes over the financing stages. The main source of risk in early stage investments arises from factors internal to the portfolio firm, such as poor management, inability to develop a workable prototype, or improper financial controls. In latter stage deals, most of the risk arises from factors which are external to the portfolio firm and are less subject to agency cost concerns, such as technological change, competitive pressure, or an economic downturn.

Sahlman (1990) reports that about two-thirds of venture capital funds are structured as limited partnerships and that in recent years up to 80 percent of the funds invested in venture capital pools have been invested in limited partnership pools. Due to their prevalence, part of our analysis will specifically examine influences affecting limited partnership investment patterns. This second set of analyses allows us to more closely examine investment structure influences without the confounding effects of other organizational forms being included in the analysis.

III. THE SURVEY INSTRUMENT AND RESEARCH METHODOLOGY

A survey was developed to determine the impact of various influences on the financial structure of venture capital investments. Prior empirical work in venture capital has not examined financing structure influences, nor do data

bases exist to provide "hard" data for such a study. The responses to this survey project comprise a data base, albeit limited, for the study of venture capital financing preferences and influences. The survey instrument requested information on various items, including the characteristics of the venture capital firm and the percentage of funds invested at various financing stages.

Prior versions of the survey were pretested among eight venture capitalists. Their comments and suggestions were incorporated into the final survey format. No one who was part of the pre-test was included in the mailings. A cover letter assured recipients that individual survey responses would be confidential and were to be anonymous. Surveys were mailed in February/March 1990 to 350 members of the National Venture Capital Association; second and third mailings focusing on non-respondents occurred in May 1990 and in the summer of 1990. A total of 126 responses were received for a response rate of 36.0 percent. From comparing the average responses of the three mailings, no evidence of response bias exists.

The typical venture capital firm responding to the survey is a private limited partnership (item I of Table 1). In our sample, 72.2 percent of the respondents are limited partnerships; from Sahlman (1990), about 69 percent of U.S. venture capital firms are organized as limited partnerships. Most of the respondents are larger funds, with over \$50 million of total funds managed (item IV). This is also in close agreement with Sahlman's (1990) industry statistics; he reports the average (median) capital size of an independent, private sector venture capitalist is \$65 million (\$30 million) in 1988. The portfolios of the firms in our sample are fairly diversified; over half of the respondents' portfolios have investments in seven or more industries and nearly half have stakes in 30 or more companies (Items II and III).

The venture capitalists' responses to a question regarding their relative commitment of funds to each financing stage are summarized in the four columns presented in Table 1 (Item V). The financing stages listed in Item V are commonly used in the venture capital literature and are in standard use by practitioners (Sahlman 1990). The reported means are based upon the actual numerical replies given by the respondents. Our sample appears to be more actively involved in seed stage investing than the industry averages reported in Sahlman (1990, Table 1C). According to Sahlman's data, about 12.5 percent of venture capital funds are invested in seed stage investments, 67.5 percent in expansion stages, and 20.0 percent in leveraged buyouts. Our sample has about 25 percent of capital invested in seed stage deals, about 59 percent in expansion stage deals, and 16 percent in LBOs.

Comparing the size and composition of the venture capital firms in our sample to industry data reported in Sahlman (1990), the firms in our sample appear to be representative of firms in the industry. An exception is that the

Table 1
Aggregate Information Collected from
Survey Items I through V.

I. Type of Venture Capital Firm:

	<i>Frequency</i>
i. Public	9
Private	114
Missing	3
ii. a. Limited Partnership	91
b. SBIC/MESBIC	14
c. Corporate Subsidiary	14
d. LBO	12

(some respondents checked more than one category)

II. Number of Different Industries Represented in the Firm's Portfolio (DIFINDS):

1-3 industries:	17
4-6 industries:	34
7-9 industries:	32
10 or more:	41
missing:	2

III. Number of Companies in the Firm's Portfolio (COMPS):

1-9:	25
10-19:	29
20-29:	18
30 or more:	53
missing:	1

IV. Total Amount of Funds Managed Within the Venture Capital Firm (TOTFUNDS):

less than \$10 million:	16
\$11-20 million:	12
\$21-30 million:	10
\$31-40 million:	12
\$41-50 million:	7
over \$50 million:	67
missing:	2

(continued)

Table 1
(continued)

V. Percentage of Financing Done at each Stage by the Respondents. The Reported Percentages are Summarized in the Categories Below. The Average for each Financing Stage is based upon the Actual Numerical Responses.

Stage	Percentages				Average	Number of firms
	0-9%	10-20%	21-49%	50% or more		
Start-up or seed	39	33	26	24	25.32%	122
first	31	34	41	14	22.63%	121
second	39	35	38	9	18.34%	121
third	59	39	17	6	12.46%	121
bridge	93	17	8	2	5.58%	120
LBO	79	9	15	17	16.08%	120

VI. Percentage of Current Investments which Include Some Form of:

Category:	1	2	3	4	5	6	7	Number of Firms
	0%	1-20%	21-40%	41-60%	61-80%	81-99%	100%	
Common equity (CSFIN)	9	52	17	7	3	11	25	124
Preferred equity (PSFIN)	8	6	7	14	18	47	26	126
Debt (LTDFIN)	12	50	25	19	3	4	6	119

	Mean Categorical Response	Standard Deviation of Categorical Responses
Common equity:	3.613	2.183
Preferred equity:	5.167	1.724
Debt:	2.891	1.483

sample firms have relatively more capital invested in seed stage deals than the industry average.

Table 1 also reports the categorical responses and the mean categorical response for the percentages of the respondents' investments that involve common stock, preferred stock, and debt financing (Item VI). The most popular financing mode is preferred equity; the least used is debt. There is a wide range of responses for each financing choice, including venture capitalist firms that always use a particular financing mode (100%) or that never use a particular financing mode (0%).

IV. STATISTICAL ANALYSIS OF SURVEY RESPONSES

First we examine the effect of different classes of organizational structure on venture capital investment practices. In this analysis, we use the non-parametric median test. The median test can be used to determine if k samples have been drawn from the same population or at least from populations of equal medians. The test statistic is distributed as a chi-square random variable with $k - 1$ degrees of freedom.¹

Do venture capitalist organizational characteristics affect their relative use of investment vehicles? Table 2 presents information on the relationship between organizational form (limited partnership, SBIC, corporate subsidiary) and the relative use of common equity, debt, and preferred equity by the respondents.

From the data presented in Table 2A, the use of common stock as an investment vehicle is related to the venture capitalist's organizational form at the 10 percent level of significance. The data used by the median test shows that responding SBICs use relatively more common equity financing than limited partnerships; corporate subsidiaries use relatively less.

The test results shown in Table 2B indicate that similarities exist among the different organizational forms in their use of debt. But a statistical test using pairwise comparisons finds that SBICs use proportionately more debt in their investments than either limited partnerships or corporate subsidiaries. This was expected because of their need for income to service their debt obligations. Coupled with the finding in Table 2A, these results apparently imply that SBICs frequently use convertible debt as an investment vehicle.

As shown in Table 2C, differences in organization form can lead to significant differences in the use of preferred equity. The data show that limited partnerships make more frequent use of preferred equity as an investment vehicle, which is in agreement with some casual empirical evidence (Sahlman, 1990). SBICs and corporate subsidiaries are less likely to use preferred equity as often.

Next we examine the relationship between venture capitalist organizational form and the proportion of funds they invest across the different financing stages. Table 3 reports the results of a test which compares the relative investment (above or below the sample's median) of funds across financing stages with organizational form.

The statistical results shown in Table 3 indicate that significant relationships exist between the organizational form of the venture capitalist and the relative amounts of funds invested in the various financing stages. Significant

Table 2

Panel A
Analysis of Common Stock Financing Patterns

	<i>Organization Form</i>		
	<i>Limited Partnership</i>	<i>SBIC</i>	<i>Corporate Subsidiary</i>
<i>Use of Common Equity is:</i>			
> median	40	8	5
≤ median	44	2	9
chi-square = 4.898 (.0864)			

Notes: The test statistic has a chi-square distribution and is based upon a median test which compares the distribution of respondents across common stock financing categories from Table 1, item VI, to the different categories of organizational form. The level of significance is given in parentheses.

Panel B
Analysis of Debt Financing Patterns

	<i>Organization Form</i>		
	<i>Limited Partnership</i>	<i>SBIC</i>	<i>Corporate Subsidiary</i>
<i>Use of Debt is:</i>			
> median	35	7	6
≤ median	46	3	6
chi-square = 2.630 (.2684)			

Note: The test statistic has a chi-square distribution and is based upon a median test which compares the distribution of respondents across debt financing categories from Table 1, item VI, to the different categories of organizational form.

Panel C
Analysis of Preferred Stock Financing Patterns

	<i>Organization Form</i>		
	<i>Limited Partnership</i>	<i>SBIC</i>	<i>Corporate Subsidiary</i>
<i>Use of Preferred Equity is:</i>			
> median	24	0	0
≤ median	62	10	14
chi-square = 8.567 (.0138)			

Notes: The test statistic has a chi-square distribution and is based upon a median test which compares the distribution of respondents across preferred stock financing categories from Table 1, item VI, to the different categories of organizational form. The level of significance is given in parentheses.

Table 3

Reported chi-square Test Statistics and Corresponding Probability Values from a Median Test. We Examine Differences in the Relative Commitment of Funds to Various Financing Stages by Venture Capitalists of Different Organizational Forms.

Financing Stage	Organizational Form:			chi-square Test Statistic	Probability Value
	LP	SBIC	Corp. sub.		
SEED					
> median	40	0	4	9.024 ^b	0.0110
≤ median	44	10	9		
FIRST					
> median	43	2	4	5.057 ^a	0.0798
≤ median	40	8	9		
SECOND					
> median	32	6	5	1.730	0.4211
≤ median	51	4	8		
THIRD					
> median	25	7	8	9.614 ^c	0.0082
≤ median	58	3	5		
BRIDGE					
> median	27	2	5	0.931	0.6279
≤ median	55	8	8		
LBO					
> median	34	5	5	0.339	0.8441
≤ median	48	5	8		

Notes: ^a = significant at the ten percent level

^b = significant at the five percent level

^c = significant at the one percent level

differences in investing patterns exist between limited partnerships, SBICs, and corporate subsidiaries in the seed, first, and third round financing stages. From examining the cross-tabulations, we see these differences arise as SBICs and corporate subsidiaries invest proportionately less in seed and first stage deals and proportionately more in third stage deals than limited partnerships. Given their need for income to service their debt obligations, it is not surprising that SBICs are less involved in early stage deals. This observed investment pattern for corporate subsidiaries shows their inclination to invest in firms with successful track records.

Limited Partnerships

Because of their prevalence as a venture capitalist organizational form, further analysis examines only those respondents that indicated they were limited partnerships. The next set of analyses studies venture capitalist size and portfolio diversification and their effects on investment vehicles and investment patterns.

Three measures are used to proxy venture capitalist size and diversification: the number of different industries in the firm's portfolio (DIFINDS, Table 1, Item II), the number of companies represented in the firm's portfolio (COMPS, Table 1, Item III), and the total amount of funds under management (TOTFUNDS, Table 1, Item IV). Chi-square tests for independence are used to determine if size and diversification are related to the use of the different investment vehicles²; we also report the relevant correlation coefficient based upon the raw, uncategorized data. Self-reported data on the percentage of funds invested in each of the financing stages are used to compute correlation coefficients between the relative amount invested in each stage (Table 1, Item V) and the use of each investment vehicle (Table 1, Item VI).

Common Equity

As seen in Table 4, the use of common equity as an investment vehicle is independent of size or diversification when DIFINDS and COMPS are used as proxies. However, size and common equity are related when TOTFUNDS is the size/diversification measure. The correlation coefficient computed using the raw data reveals that larger limited partnerships use relatively less common equity financing, although the correlation is not statistically significant. Thus, somewhat weak evidence exists that smaller venture capital limited partnerships favor common equity as an investment vehicle more so than larger ones.

Correlation analysis indicates that the use of common equity as an investment vehicle may also result from a "financing stage effect." Analysis indicates that venture capitalists that use relatively more common equity financing are less committed to early stage deals and are more heavily involved in latter stage financing, although only the correlations with first stage and LBO stage investments are statistically significant. These findings imply that the use of common equity as an investment vehicle is more likely to occur in latter stage investments.

Table 4
Limited Partnerships' Common Stock Financing Patterns

Cross-tabulations between Limited Partnerships' use of Common Stock Financing and Their Size and Diversification.

		<i>CSFIN Category:</i>		
		<i>1</i>	<i>2</i>	<i>3</i>
DIFINDS Category:	1	30	11	16
	2	14	6	10
Chi-square = 0.325		<i>p</i> -value = 0.850		
Correlation coefficient (raw data) = 0.084				
<i>p</i> -value = 0.221				
COMPS Category:	1	20	11	14
	2	24	6	13
Chi-square = 1.827		<i>p</i> -value = 0.401		
Correlation coefficient (raw data) = -0.147				
<i>p</i> -value = 0.086				
TOTFUNDS Category:	1	12	11	10
	2	33	5	17
Chi-square = 8.922		<i>p</i> -value = 0.012		
Correlation coefficient (raw data) = -0.131				
<i>p</i> -value = 0.112				

Correlation Coefficients Between the Limited Partnerships' Use of Common Stock Financing and the Percentage of Financing Done in Various Stage Deals.

<i>Financing Stage</i>	<i>Correlation Coefficient</i>	<i>p-value</i>
Seed	-0.1027	0.172
First	-0.3756	0.000
Second	-0.1175	0.141
Third	0.0502	0.323
Bridge	0.0837	0.223
LBO	0.3809	0.000

It is somewhat surprising that there is no significant relationship between the amount of seed stage investing by a venture capitalist and the use of common stock as an investment vehicle. Although a statistically significant negative relationship exists between the percentage of funds invested in first stage deals and the use of common equity, other factors must partially mitigate the effects of using common equity for seed stage investments.

Long-term debt

The results of chi-square tests reported in Table 5 demonstrate that there is a significant relationship between venture capitalist portfolio diversification, as measured by DIFINDS, and the use of debt by the venture capitalist. A crosstabulation table indicates that venture capitalists that are diversified across a greater number of industries are more amenable to the use of debt as an investment vehicle, although the positive correlation coefficient computed from the raw data is not statistically significant.

Correlation analysis indicates that proportionately larger involvement in seed, first, second, and third stage financing (early and expansion stage deals) is negatively related to the use of debt. Greater relative investments in LBO stage deals is positively related to the use of debt. This supports the conjecture (Norton & Tenenbaum, 1992) that debt is unfit as an early stage financing vehicle; its use is more appropriate for latter stage deals where tangible assets and positive cash flow make debt a more appropriate vehicle for monitoring the firm.

Preferred Equity

The chi-square tests reported in Table 6 indicate statistically significant relationships between the COMPS and TOTFUNDS measures and use of preferred equity. Cross-tabulations and correlations indicate that venture capitalists with investments in more portfolio firms (COMPS) and with larger amounts to invest (TOTFUNDS) are more likely to use moderate to high amounts of preferred equity in their portfolios. In addition, the correlation coefficient between DIFINDS and the relative amount of preferred equity used is negative and statistically significant, although the chi-square test accepts the null hypothesis of independence between these two variables.

Venture capitalists' relative involvement in seed, first, and second stage deals is positively related to the venture capitalist's relative use of preferred equity as an investment vehicle, whereas venture capitalists with larger relative commitments to LBOs are less likely to use preferred equity. Unlike our findings using common stock, here there is a significant positive relationship between the use of preferred equity and the relative amount of seed stage financing by the respondents. Evidently preferred equity is an attractive means whereby seed stage investments are monitored to reduce agency concerns.

Table 5
Limited Partnerships' Debt Financing Patterns

Cross Tabulations Between Limited Partnerships' Use of Debt Financing and Their Size and Diversification.

		<i>LTDFIN Category</i>		
		<i>1</i>	<i>2</i>	<i>3</i>
DIFINDS category:	1	36	14	5
	2	11	17	1
Chi-square = 9.077		<i>p-value</i> = 0.011		
Correlation Coefficient (raw data) = 0.067		<i>p-value</i> = 0.273		
COMPS category:	1	29	12	4
	2	20	19	2
Chi-square = 3.722		<i>p-value</i> = 0.156		
Correlation coefficient (raw data) = -0.107		<i>p-value</i> = 0.164		
TOTFUNDS category:	1	18	13	2
	2	31	18	3
Chi-square = 0.219		<i>p-value</i> = 0.896		
Correlation coefficient (raw data) = -0.083		<i>p-value</i> = 0.226		

Correlation Coefficients Between the Limited Partnerships' Use of Debt Financing and the Percentage of Financing Done in Various Stage Deals.

<i>Financing Stage</i>	<i>Correlation Coefficient</i>	<i>p-value</i>
Seed	-0.2032	0.032
First	-0.2688	0.007
Second	-0.2586	0.009
Third	-0.1686	0.064
Bridge	-0.1017	0.182
LBO	0.5861	0.000

Table 6
Limited Partnerships' Preferred Stock Financing Patterns

Cross tabulations between Limited Partnerships' Use of Preferred Stock Financing and Their Size and Diversification.

		<i>PSFIN category</i>		
		<i>1</i>	<i>2</i>	<i>3</i>
DIFINDS category:	1	5	15	39
	2	1	12	17
Chi-square = 2.454 <i>p-value</i> = 0.293				
Correlation coefficient (raw data) = -0.139 <i>p-value</i> = 0.098				
COMPS Category:	1	6	11	30
	2	0	16	27
Chi-square = 6.920 <i>p-value</i> = 0.031				
Correlation coefficient (raw data) = 0.144 <i>p-value</i> = 0.88				
TOTFUNDS category:	1	4	13	17
	2	2	13	41
Chi-square = 5.552 <i>p-value</i> = 0.062				
Correlation coefficient (raw data) = 0.248 <i>p-value</i> = .009				

Correlation Coefficients Between the Venture Capitalists' Use of Preferred Stock Financing and the Percentage of Financing Done in Various Stage Deals.

<i>Financing stage</i>	<i>Correlation Coefficient</i>	<i>p-value</i>
Seed	0.1966	0.032
First	0.2135	0.023
Second	0.1282	0.117
Third	-0.0800	0.229
Bridge	0.0644	0.277
LBO	-0.3507	0.000

V. CONCLUSION

This paper has provided empirical evidence that differences in venture capitalists' use of financing vehicles are partially explained by venture capitalists' characteristics and investing patterns. We find that venture capital organizational form affects the type of investments in our sample. SBICs and

corporate subsidiaries are less likely to be involved in the early financing stages. SBICs are more willing to use common equity and debt, presumably in the form of convertible debt, in their investments. Both corporate subsidiaries and SBICs use relatively less amounts of preferred equity in their investments.

Focusing on the limited partnership organization form, we find that venture capitalist size and diversification has some impact on financing structure in our sample. The findings, however, are not particularly robust across our different size and diversification measures.

Compared to smaller and less diversified venture capitalists, we find that larger venture capitalists and venture capitalists that have many firms in their investment portfolios use relatively more preferred equity as an investment vehicle. More diversified venture capitalists (as measured by DIFINDS) use relatively more debt as an investment vehicle, and larger venture capitalists (as measured by TOTFUNDS) use relatively less common equity financing.

Another major determinant of financing structure preferences is the distribution of the venture capitalist's investments among the different financing stages. Limited partnerships favoring common equity as an investment vehicle are less involved in early stage deals, while those using less common equity are more heavily committed to early stage investments. Strong sentiment in favor of preferred equity investing is seen in venture capitalists that are relatively more devoted to early and growth stage deals. Less frequent use of debt occurred in venture capitalists with relatively greater commitments to early stage deals and relatively less commitment to LBO stage deals.

From these results, apparently the differences between early and later stage deals and investors of different sizes and diversification strategies are such that specific investment vehicles are needed to best meet the investor's goals. But a disappointment of the study is the number of insignificant test statistics and seemingly inconsistent results (e.g., the relationship between common equity financing and the relative investments in seed and first stage investments reported in Table 4). This apparently indicates that much of the variation in the use of common stock, preferred stock, and debt as investment vehicles is not explained by our analysis. Obviously, this implies additional research is needed to explain these observed venture capital behavior patterns.

Future research may examine if differences in the management philosophy and the style of venture capitalists (as found by MacMillan, Kulow, & Khoylean, 1989) affects deal structure. Future research can also examine the use of "micro" elements of financial contracting in venture capitalist deals, for example, the provisions found in term sheets. Perhaps an examination of

the agency and monitoring relationships that exist in venture capital can increase our knowledge of the empirical relationships we observe between venture capitalist attributes and investment characteristics.

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NOTES

1. For an overview of the median test, see S. Siegel, *Non-Parametric Statistics for the Behavioral Sciences*, McGraw-Hill: New York, 1956.
2. To ensure adequate observations in each cell for the chi-square test, the categories for the number of different industries in the limited partnership portfolio (DIFINDS), the number of different companies in the portfolio (COMPS), and the amount of funds under management (TOTFUNDS) shown in Table 1 were combined into two categories for each size/diversification measure. The DIFINDS categories were combined so one class included venture capitalists investing in one to nine different industries and the other class contained venture capitalists investing in 10 or more industries. Two COMPS categories included those venture capitalists with less than 30 portfolio firms and those with 30 or more portfolio firms. One TOTFUNDS category contains investors with \$50 million or less to invest, the other has those with more than \$50 million. The CSFIN, PSFIN, and LTDFIN categories were each collapsed into three categories of low usage, (0–20%), moderate usage (21–80%), and high usage (over 80%).

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