EARLY DRAFT – NOT FOR CITATION

Management Quality and Financial Performance:

Empirical Evidence from Private Equity

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Abstract

Using data from hundreds of private equity financings, we examine the relationship between management quality, valuation, ownership ratio, and valuation in subsequent rounds. We find that better management teams are associated with higher valuations and more money raised, and benefit from lower ownership ratios (the amount of ownership yielded up to investors). We also find that CEOs with previous IPO experience are able to achieve higher valuations in subsequent finance rounds, relative to less-experienced CEOs. The results indicate that our measure of managerial competence is useful in predicting financial outcomes.

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1. Introduction

Managerial competence is clearly an important ingredient in the success of

a business. Previous research has focused on how management quality relates to

various aspects of financial performance at various stages in the firm's life cycle.

For firms that achieve IPO status, management quality is also important

(Chemmanur and Paeglis, 2004). Finally, for firms that issue stock following the

IPO, management affects the firm's financial policies, SEO characteristics, and

post-SEO performance (Chemmanur, Paetlis, and Simonyan, 2004). Younger

CEOs and those with MBA degrees tend to be more aggressive (Bertrand and

Schoar, 2003).

In this paper, we examine firms at very early stages of development, and

consider whether managerial quality is related to financial performance at

companies that have not yet listed on public stock exchanges. Previous research

has shown that in such firms, investors—specifically, venture capitalists—

consider the competence of the management team (Kaplan and Strömberg, 2004),

but empirical evidence on the relationship between managerial quality and

performance is in its early stages. We consider this relationship, and focus on

various aspects of management teams. We include firms funded by private equity investors of varying degrees of sophistication, from angels to corporate venture capital arms to professional venture capitalists to private equity firms focused on late-stage financing and acquisitions.

We find that managerial quality is significantly related to the firm's valuation, to the amount raised, and to the ownership ratio. Better management teams achieve higher valuations and raise more money, and they yield up a relatively smaller portion of the firm's equity to outside investors. We also find that, in subsequent financing rounds, CEOs with previous IPO experience achieve significantly higher valuations than CEOs with less extensive backgrounds.

The paper proceeds as follows. Section 2 describes the data and some new variables we construct based on information from a professionally-conducted survey, and introduces our hypotheses, models and statistical methods. Section 3 contains results of our analysis of the new variables, and Section 4 presents results of empirical tests of our major hypothesis that management matters. Section 5 summarizes our main findings.

2. Data, Variables, and Models

2.1 Data

We employ a data set based on a professionally-conducted survey of executive officers for firms that received their seed or A-round of private equity

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financing in the period from January 1, 1998, through June 30, 2001.[1] The firms

were initially randomly selected from VentureOne's VentureSource database,

which is commercially available. Gompers and Lerner (2000) based their study

on that data set as well, although their analysis included only firms that received

funding prior to 1996, and was restricted to U.S. companies.

Due to the detailed nature of our survey, we focus on only a sub-set of the

possible universe of high-tech firms. The Appendix contains detailed information

on the number of surveyed companies that agreed to provide information relating

to valuation and amount raised for at least one financing round.[2] Our data set

reflects stratified survey sampling, motivated by a desire to have a statistically

valid number of firms representing each of the high-technology industry

categories of interest: biotechnology and pharmaceuticals, semiconductors and

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[1] The companies analyzed in this paper were selected from VentureOne's VentureSource database, which contains data on privately held firms. To construct the list of firms that were contacted for interviews, we selected only firms that had received their first round of funding from January 1, 1999 through to June 30, 2001. We only chose firms in the industries of biotech and pharmaceuticals, semiconductors and electronics, services, software, and telecommunications. Once we contacted these firms, we discovered some differences from what was contained in the VentureOne data base, such that a number of these firms in fact actually received funding before January 1, 1999. Thus, the present study includes firms that reported to us that their initial round of funding was received any time between January 1, 1998 and June 30, 2001. We consider all initial funding rounds of less than $1,000,000 as "seed" funding rounds (any initial funding round of greater than this amount is considered a "first" round of funding). Note that, as reported in Table 1, Panel A, some financing rounds took place in the third and fourth quarters of 2001. We kept these funding rounds in the data, but since we only had information on number of employees for the first two quarters of that year, such observations drop out of any specifications using log employees as an independent variable. Funding rounds prior to the first quarter of 1999 similarly drop out when the number of employees is included in the estimation for the same reason.
[2] For each industry group in the study, we randomly selected a portion of firms to be contacted, with the provision that they had to have received their first round of financing in 1999, 2000, or the first two quarters of 2001. Firms that agreed to an interview were then asked questions concerning the number of financing rounds and the company characteristics at the time of the funding event. The appendix indicates the total population of firms, the number contacted, those that agreed to an interview, and the numbers that revealed information concerning the amount of money raised in and the pre-money valuation for the funding event.

electronics, services, software, and telecommunications. For example, of the total

universe of firms indicated in the data base as receiving financing in the period we

consider, we interviewed a total of 8%, of which three-quarters (6% of the entire

data base) provided valuation information from at least one round of financing.

The portion of firms interviewed within industries ranged from a high of 25% of

biotechnology and pharmaceutical firms to a low of 5% in services companies

since many more services companies existed in the VentureSource data base.

The survey was conducted in late 2001 by personnel who had achieved

certification under the Interviewer Quality Control Scheme (IQCS) in accordance

with the Market Research Society Code of Conduct, guaranteeing the

interviewees total anonymity and confidentiality. Various portions of the survey,

including the valuation data, were double-checked and triple-checked by the

professional survey personnel, and respondents were re-contacted for verification

in the event of discrepancies between the commercially available data base and

the interview information.[3] Nevertheless, due perhaps to privacy concerns or

unwillingness to answer all questions, some data are incomplete for some

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[3] In addition, two separate stages of spot checks were performed by high-technology industry experts regarding financing round information using web site information for the companies included in the survey (especially for figures relating to the amount raised in the financing round). We found that, based on the numerous discussions with managers of start-ups, a number of early seed and startup financing rounds were omitted from the original VentureOne database, perhaps especially in Europe. Information on these rounds is important—regression results using the valuation data from the entire original VentureOne data set from which we drew our sample (available upon request from the author) show that the raw database numbers indicate significantly *lower* valuations in countries with common law legal origin, although these results do not control for number of employees, or any of the other firm-level variables we report in Tables 5 and 6. Even selecting only the firms included in the survey (and there were many firms for which analogous financing rounds could not be found between the two data sets—meaning the disagreement as to the timing of the round closing date was off by more than one quarter [three months]), our findings were reversed compared to our higher quality data.

financing rounds, leading to differences in the number of observations for the various statistical tests we perform. However, we were able to obtain data on valuation from a much higher portion of firms than in the commercially available data base that formed the universe from which we chose sample firms, and due to the exhaustive checking procedures we employ, have confidence that the resulting valuation and other data are of high quality.

2.2 New Variables

In addition to a vector of control variables introduced in previous valuation studies (Gompers and Lerner, 2000; Lerner and Schoar, 2004), we use the survey responses to develop a number of new variables relevant to our hypotheses.

Management Team Strength (MGTINDEX): Kaplan and Strömberg (2004) evaluated how VCs utilize the management team's strength during the screening process when making an investment decision. They found a significant and positive relationship between the VC's initial appraisal of the management team and the entry-stage firm's subsequent performance. They also analyzed management team strength using a dummy variable capturing whether the CEO is a repeat entrepreneur, but they found no significant relationship between this variable and valuation. Our data contain considerably more detail about the strength of the major management team positions, and we incorporate it into our

analysis. Hellman and Puri (2003) examined professionalization of management

team staff, but they did not empirically measure the relationship between

management team strength and valuation.[4]

We construct a measure, MGTINDEX, which is a ranking of the scores of

the management team survey responses relating to positions filled and experience

level of the named positions (CEO, VP Sales, CTO, and VP Engineering). This

variable is based on an innovative method for measuring the overall effect on

valuation of several types of geographical proximity (the GeoIndex measure of

Boasson, Boasson, McPherson, and Shin, 2005). Both that index and the one we

introduce here are transparent and straightforward techniques for measuring how

valuation is related to intangible—but nevertheless important—issues. The score

is calculated as follows:

$$MGTINDEX_{j,k} = \sum_{i=1}^{N} rank_{i,j,k} ,$$

where i represents each of five (N) management team survey questions, and j

represents each funding round for each firm k. We ranked the responses, with

higher ranks for funding rounds with more management team positions filled or

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[4] Note that causality between valuation and management team strength may be difficult to
determine. Firms with more experienced management teams may well receive higher valuations,
reflecting a greater ability to achieve successful outcomes when confronted with adverse
conditions or unforeseen problems. At the same time, firms with good prospects that should
therefore receive a high valuation may be better able to attract more experienced management.
We thus examine the relationship between management team strength and valuation without
drawing causal inferences.

with higher experience levels of the named positions.[5] The MGTINDEX score

represents the sum of these rankings. For ease of presenting coefficient

magnitude, we divided the score rank by 100, with resulting values ranging from

.01 to 16.24; the higher the score, the fuller and more qualified the management

team is at the time of the financing round.[6]

Investor Sophistication (SOPHIST): In the negotiations surrounding private equity

contracts, potential new investors generally try to obtain low valuations (so that

the given or fixed investment amount that is raised in the financing event will

purchase a larger amount of the firm's equity), whereas founders and existing

investors will try to obtain higher valuations, in order to maintain ownership of a

higher portion in the firm's total equity following the investment. Thus, more

sophisticated investors may find it easier to negotiate lower valuations, because

their reputation and abilities will be associated with improved non-pecuniary

assistance (Gorman and Sahlman, 1989), or because of the reputation-based

certification they offer to the portfolio firm (Hsu, 2004). Kaplan, Martel, and

Strömberg (2003) examine the importance of learning by investors. In their

paper, controlling for the level of sophistication of investors, legal setting

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[5] The management team questions related to the number of top managers and of the experience
levels for the CEO, Vice President of Sales, Chief Technology Officer, and Vice President of
Engineering. Exact wording of the questions and data for the MGTINDEX by country, stage of
development, and industry is available from the authors on request.
[6] With five potential financing rounds by 351 firms, there were a total possible number of
MGTINDEX scores of 1 to 1755. Due, however, to "ties" when two firms had identical scores,
the ranking ranges from 1 to 1624, which we then divide by 100; the variable thus ranges from
0.01 to 16.24 as indicated in Panel G of Table 1.

(common law, etc.) does not have a significant relationship with contractual

provisions. To control for investor sophistication, we construct a (dummy)

variable, SOPHIST, equal to 1 if either the investor had significant management

experience in the industry, or if the investor had numerous other portfolio

companies in the same industry.[7]

Ownership Ratio (OWNRATIO): VC investments outside of the U.S. are generally

associated with weaker liquidation and exit rights; contracts written in common

law countries contain more rights and provisions than their civil law counterparts.

Whether or not *more sophisticated* VCs introduce additional covenants in

contracts for early-stage firms located in non-common law based countries

remains an open question. Kaplan, Martel, and Strömberg (2003), who examined

VC contracting in 23 countries, concluded that when the sophistication,

experience, and age of the VC are considered, differences in legal systems across

countries become insignificant in explaining differences in contractual terms.

Conversely, Lerner and Schoar (2004) found that contracts differ significantly

across legal regimes, even controlling for the sophistication (legal origin) of the

venture capitalist firm.

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[7] The questions on the survey were worded: "How many other companies in your industry were in your lead investor's portfolio at the financing event?" and, "How would you describe your lead investor's level of experience in your industry during the financing event: (1) no management experience at all, (2) little management experience, (3) some management experience, or (4) a lot of management experience." The sophisticated investor dummy variable (SOPHIST) was set equal to one if the survey respondent indicated that the investor had more than 10 other companies in the same industry, or had "a lot" of management experience in the industry.

To examine the relationship between legal environment and contracting terms, we construct a variable, OWNRATIO or ownership ratio, which is the amount of money raised during the financing round divided by the pre-money valuation at that point in time. If VCs or other investors are able to rely on well-enforced contracting techniques (liquidation rights, ability to replace managers, etc.), they may require a lower portion of equity as the price of their investment; *ceteris paribus*, their risk is reduced through contracting provisions.

Other factors may also affect the ownership ratio. For example, if more sophisticated investors rely on complex contractual provisions as opposed to demanding a greater share of equity, sophisticated investors should be associated with a *lower* ownership ratio. Conversely, investors in common law legal environments where contractual provisions are more complex and easier to enforce might more willingly obtain a smaller share of the equity of portfolio firms. This would indicate that a larger ownership ratio should prevail in civil law countries where investors rely on significant portions of equity ownership, eschewing complex contractual provisions such as liquidation and exit rights. Finally, if certification and non-pecuniary services associated with sophisticated investors are important, sophisticated investors should be able to negotiate a higher ownership ratio, purchasing more of the firm's equity with a given investment amount. We will test each of these hypotheses.

Patents (PATENTS) and their Usefulness (USEFUL): Previous studies have

examined the importance of patents in high-technology firms, and whether VCs

are effective at spurring innovation (Kortum and Lerner, 2000). We postulate that

possession of patents may be related to valuation. We construct the dummy

PATENTS taking the value of 1 if the firm had patents at the time of the funding

round. To differentiate the effect on valuation of mere possession of patents from

the effect of holding efficacious patents we construct a second dummy variable

USEFUL that takes the value of 1 if the patents were considered "useful" for

generating barriers to entry by the interviewed manager of the portfolio

company.[8]

Number of Non-Pecuniary Services (NUMSVCS): Hsu (2004) demonstrates that

VC firms with better reputations obtain equity in portfolio firms at a 15%

discount relative to less sophisticated investors. Although a certification role

probably explains a large portion of this discount, another reason may be related

to the value-added services that more sophisticated and experienced investors

provide for their firms, which can take many forms. Our survey included

questions related to customer introductions, strategic alliance introductions,

portfolio company alliances, recruitment and hiring, marketing and public

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[8] The question on the survey was worded, "Do you think these patents are significant to your strategy and to establishing barriers, by giving you a competitive advantage?". Regarding the potential endogeneity of valuation and characterizations of patents as useful, see Cressy and Hall, 2005.

relations, financial management, engineering and product development assistance, real estate assistance, strategy development, and technology assistance.

This non-pecuniary assistance provided by investors may affect valuation, such that VCs could negotiate a lower valuation if accompanied by a promise to provide key introductions and assistance. We construct a variable, NUMSVCS, which is the sum of all types of non-pecuniary assistance provided by the investor. This is an important aspect of the contracting negotiation, since VCs or other investors that provide more assistance may be able to negotiate a lower valuation, purchasing more of the firm's equity with a given fixed investment amount.

Management Replacement (MGTREPLACE): It is generally believed that entrepreneurs who are skilled at envisioning new products and creating start-up firms are often not the best managers of the routine affairs typical in an established, more mature company. Cressy and Hall (2005) and Hellman and Puri (2003) examined the replacement of founding entrepreneurs by professional CEOs; one finding from these studies is that VC investment is important for the replacement of managers. To examine this in light of potentially different incentives based on various levels of VC participation in a funding round, we construct a variable, MGTREPLACE, equal to "1" if the investors recommended or required replacement during the funding round.

2.3 Descriptive Statistics

Table 1 displays descriptive statistics for the variables relating to the type and number of financing rounds, and for the mean log of pre-money valuations.[9] As indicated in Panel A, we obtained valuation information on 290 financing rounds for early-stage companies (portfolio firms in the start-up, product development, or beta testing stage). We were also able to gather information from 193 financing rounds which were expansion stage investments (portfolio firms in the shipping, multiple release, or profitable stage of development). Summaries of valuation observations broken down by stage of development and industry are presented in Panels B and C. Panels D and E break down .

INSERT TABLE 1 ABOUT HERE

2.4 Hypotheses and Methodology

In this paper, we test a number of hypotheses concerning how managerial characteristics affect the relationship between high-technology firms and their investors. To examine each of these hypotheses, we make use of a number of different econometric techniques in our analysis. In terms of our reported results, for models with dependent dummy variables, we perform logit regression analysis, using robust estimation (i.e., correcting error terms for

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[9] To ensure that outliers were not driving our results, we removed from the valuation observations all funding rounds with natural log valuations either above or below four standard deviations from the mean.

heteroskedasticity). We used a fixed-effects generalized least squares (GLS; within) model to estimate the time-varying, firm-specific relationship between management team strength (MgtIndex) and portion of VC funding. For all of the other models we estimate (specifying as dependent variables the log of pre-money valuation, the log of amount raised, and the ownership ratio), we use robust ordinary least squares ("robust" again referring to heteroskedasticity-corrected error terms).

The control variables are listed in each specification, but for ease of presentation we do not report coefficients for the battery of dummies relating to stage of development, industry, and type of funding round. Due to occasionally missing data for some observations, we were forced to choose our variables with a goal to maximizing the number of observations while at the same time including as many controls as possible. Where appropriate, we replicate the control variable set of Gompers and Lerner (2000), although not all of the variables available to them were available to us.[10] For example, we generally control for the natural log of number of employees,[11] log of quarterly sales, the type of round (seed, first, etc.), the industry (biotech, etc.),[12] and market timing variables (including industry index and inflows into VC partnerships to account for the money chasing

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[10] Notably, our question on the survey instrument relating to firm age was unfortunately badly worded and vague, and provides little explanatory power in multivariate models.

[11] Note that for tests reported in Tables 3-6, in any specifications including log of employees as an independent variable, valuation observations for the third and fourth quarters of 2001 were omitted, since we only had data on number of employees through the second quarter of 2001.

[12] In addition to controlling for industry characteristics by using a battery of industry-specific dummy variables, in a series of robustness checks for our results, we control for over-sampling of certain industry group using both Heckman and survey-based regression analysis. All of the findings of Tables 5 and 6 were robust to both such estimation techniques; see section 6 for details of our robustness checks.

deals effect, an important factor in the time period under examination). We also

control for firm stage of development, except in the estimation where we split the

sample into early-stage (startup, development, and beta) and expansion (shipping,

multiple, profitable) financing rounds (Table 5 columns G and H). Table 1

contains descriptive statistics of all of the variables used in our paper.

INSERT TABLE 2 ABOUT HERE

3. Analysis of the New Variables

We begin our econometric analysis with a series of estimations to examine

the new variables we introduce in this paper, the results of which are reported in

Table 2.

The relationship between management team strength, measured by our

MGTINDEX variable, valuation, and amount raised is included in Columns A

and B. Including round, stage, and industry dummies, we find that the variable

does indeed enter with a positive and significant coefficient, providing initial

evidence that good managers are either able to find firms with high valuations, or

that management team strength helps determine a higher valuation. In addition,

consistent with Hellman and Puri (2000, 2003), we found that investor type

matters for the size and professionalization of the management team. In a fixed-

effects (within) generalized least squares regression to examine changes over time

in the same portfolio firm (indicated in Column C), companies receiving greater

portions of VC funding (vis-à-vis funding from other sources) had stronger

management teams, controlling for type of funding round (seed, first, etc.) and

stage of firm development (start-up, product development, etc.).

In Column D of Table 3, the dependent variable equals 1 if management

replacement is either recommended or required by the investor(s) and 0 otherwise.

Assuming that more experienced management teams are less likely to need

replacement, we include the management team index variable in this estimation.

Consistent with the arguments of Hellman and Puri (2000, 2003), we find that the

portion of professional venture capital partnership involvement in the financing

round is significantly and positively related to the probability of management

replacement. This suggests that a higher likelihood of management replacement

occurs in financing rounds dominated by VCs (as opposed to those with more

funding coming from angels, corporate venture capital, or other sources). At the

same time, firms with better management teams (operationalized here by a higher

management team index score) are less likely to face requirements or

recommendations for replacement, indicated by the negative and significant

coefficient for that variable. Finally, firms that are provided a larger number of

services are more likely to face the requirement or recommendation of

management change, perhaps indicating a high level of involvement in the

company by the VC or other investors.

4. Financial Performance and Management Quality

Recall that a firm's ownership ratio (OWNRATIO) simply reflects the amount of money raised divided by the valuation. The ratio will be larger for those funding rounds in which a higher portion of the firm's equity is purchased by the given amount of the financing commitment. In this section, we test whether superior management teams are able to negotiate lower ownership ratios with their investors.

INSERT TABLE 3 ABOUT HERE

4.1 Ownership Ratio and Managerial Quality

Table 3 displays the results of multivariate regressions relating to the ownership ratio. In all specifications where it is included, the strength of the management team is associated with a lower ownership ratio, which is consistent with the hypothesis that skilled managers can negotiate lower portions of ownership yielded to investors. Column A includes variables relating to investor sophistication and provision of non-pecuniary advice and services. The results indicate that investor sophistication and more extensive provision of non-pecuniary services are both associated with significantly *higher* portions of ownership, which is consistent with the argument relating to the importance and value of non-pecuniary services and reputational certification.

Since our data contain observations from countries in varying legal environments (common law as well as civil law), we present an additional series of robustness

tests to examine further the relationship between managerial quality and ownership ratio. Columns B through E show that irrespective of the conclusion of various location dummy variables, the coefficient for the management quality variable MGTINDEX remains positive and statistically significant, although small in magnitude.

4.2 Subsequent Valuation

One potential problem in interpreting our results relates to endogeneity—perhaps the managerial team is determining better performance (in the form of funds raised, valuation, or ownership ratio), or perhaps skilled managers are attracted to firms that have superior financial performance. Since the managerial team is constructed over a fairly extensive period of time, but the financing round takes place in a relatively short period of time, it is likely that the managerial quality predates the financial performance during a given financing round.

Nevertheless, we finally examine whether managerial quality in a given financing round has a beneficial effect on performance in later rounds. Here, we will use a smaller portion of the data we collected on the management team, focusing on the most important position: chief executive officer. Specifically, we generate a dummy variable that takes the value of "1" if the CEO had previously been involved in an IPO.

We regress this dummy along with a number of controls (as in column A of Table 2) against a measure of future performance, ExcessValuation. That

variable is generated by simply subtracting the actual valuation of the subsequent financing round from its predicted value using our basic controls: round, industry, and stage dummies, as well as log of employees, valuation of current financing round, log of inflows, industry index, log of quarterly sales revenues, and number of services. We find that the coefficient on the CEO-IPO dummy is of fairly high magnitude (0.92) and statistically significant ($p = 0.047$). This indicates that financing rounds with managers with going-public experience benefit from significantly higher valuations compared to financing rounds with less-experienced CEOs.

5. Summary

This paper uses a detailed database resulting from a survey of privately-held, high-technology companies. We found that managerial quality is related to a variety of financial outcomes. Better management teams worked for firms with higher valuations, more investment funds raised, and were forced to yield up smaller portions of equity in order to receive financing. In addition, superior management teams were more likely to be associated with larger amounts of funding from VCs (as opposed to other sorts of investors) and were less likely to face replacement. Finally, CEOs with IPO experience were related to higher valuations in subsequent financing rounds

Future work incorporating the presence of liquidity provisions and other control rights into the ownership ratio analysis would usefully extend our results.

In addition, more research into the implications of relative management team skill

levels for the investor-manager relationship and resulting negotiations

surrounding funding rounds should be undertaken.

Appendix: Firms Revealing Information

Number of Firms

Industry	Population	Contacted	Interviewed	$ Raised Data Obtained*	Valuation Data Obtained*
Biotech/Pharma	243	243	61	56	47
Telecoms	697	518	59	57	42
Electronics/Semi	299	299	37	34	21
Software	1010	823	84	81	72
Services	2201	1299	109	103	75
Total	4450	3182	350	331	257

Percentage of Total Population

Industry	Population	Contacted	Interviewed	$ Raised Data Obtained*	Valuation Data Obtained*
Biotech/Pharma	100%	100%	25%	23%	19%
Telecoms	100%	74%	8%	8%	6%
Electronics/Semi	100%	100%	12%	11%	7%
Software	100%	81%	8%	8%	7%
Services	100%	59%	5%	5%	3%
Total Sample	100%	72%	8%	7%	6%

Percentage of Firms Interviewed That Revealed Information

Industry	Interviewed	$ Raised Data Obtained*	Valuation Data Obtained*
Biotech/Pharma	100%	92%	77%
Telecoms	100%	97%	71%
Electronics/Semi	100%	92%	57%
Software	100%	96%	86%
Services	100%	94%	69%
Total Sample	100%	95%	73%

*Firms for which information on at least one funding round was revealed during the interview

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Table 1: Descriptive Statistics

Panel A: Number of Valuation Observations Per Quarter
(Mean log valuation in parentheses; includes multiple financings of same firm)

Quarter:	Early-Stage	Expansion
1Q98	4 (14.528)	0
2Q98	5 (15.530)	0
3Q98	6 (14.868)	0
4Q98	4 (14.864)	3 (15.619)
1Q99	8 (15.475)	3 (14.605)
2Q99	16 (16.178)	9 (15.751)
3Q99	18 (15.780)	8 (16.020)
4Q99	23 (15.575)	6 (16.646)
1Q00	31 (15.638)	11 (16.082)
2Q00	39 (16.152)	25 (16.596)
3Q00	35 (15.906)	22 (16.877)
4Q00	20 (16.251)	20 (16.546)
1Q01	29 (16.033)	22 (15.980)
2Q01	18 (16.102)	18 (15.899)
3Q01	6 (16.139)	18 (16.576)
4Q01	4 (16.370)	5 (15.972)
N/A	24 (15.237)	23 (16.797)
Total	**290 (15.823)**	**193 (16.356)**

Early-stage includes start-up, development, and beta; expansion includes shipping, multiple, and profitable; N/A includes refused and not reported.

Panel B: Stage of Development and Financing Round Log Valuations

Stage	n	Mean Log Valuation	Log of Minimum Valuation	Log of Maximum Valuation
Startup	66	15.959	12.612	19.232
Development	161	16.614	11.513	18.198
Beta	63	16.212	13.816	19.519
Shipping	112	16.303	13.528	20.436
Multiple	39	16.704	13.760	18.421
Profitable	42	16.177	13.816	18.493

Panel C: Valuation Observations by Stage of Development and Industry
(Mean log valuation in parentheses)

Stage	Biotech and Pharmaceuticals	Semiconductors/ Electronics	Services	Software	Telecom-munications
Startup	23 (16.071)	4 (15.374)	15 (16.313)	7 (15.261)	17 (15.922)
Development	45 (15.372)	21 (15.907)	34 (15.368)	39 (15.711)	22 (16.040)
Beta	9 (15.846)	5 (16.874)	11 (16.618)	25 (15.881)	13 (16.507)
Shipping	5 (16.094)	3 (18.350)	48 (16.178)	36 (16.077)	20 (16.753)
Multiple	1 (16.188)	2 (16.209)	17 (16.683)	16 (16.086)	3 (16.789)
Profitable	1 (16.118)	2 (16.762)	19 (15.835)	14 (16.248)	6 (16.908)
Total	84 (15.675)	37 (16.240)	144 (16.049)	137 (15.998)	81 (16.385)

Table 1: Descriptive Statistics, Continued

Panel D: Non-Dummy Variables

Non-Dummy Variables	N	Mean	Standard Deviation	Minimum	Maximum
Industry Index	662	2.155	0.797	0.876	4.663
Log of Employees	484	2.604	1.106	0	5.733
Log of Quarterly Revenues	618	5.320	6.384	0	17.387
Log of VC Inflows	660	10.225	0.232	9.622	10.463
EVCA Score	875	1.647	0.418	1.26	2.370
Log of Pre-Money Valuation	483	16.036	1.236	11.513	20.436
Log of Amount Raised	699	14.877	1.383	9.942	18.431
Bankruptcy Severity	1755	2.066	1.305	1	5
New Variables:					
NUMSVCS	624	4.788	3.209	0	10
MGTINDEX	1755	3.838	3.512	0.01	16.24
VCPORTION	707	59.562	44.612	0	100
OWNRATIO (=Amount Raised/Valuation)	406	0.337	0.229	0.005	0.984

Panel E: Dummy Variables

	Dummy Variable	# Obs (total)	# of "1"s	# Obs with valuation data	# "1"s with valuation data
Location	Common Law Legal Origin	1755	1315	483	386
	US	1755	810	483	249
Round Dummies	Seed (omitted)	462	155	483	18
	First	462	352	483	252
	Second	462	350	483	142
	Third	462	351	483	52
	> Third	462	547	483	19
Industry Dummies	Biotech (omitted)	1750	305	483	84
	Semiconductors/Electronics	1750	185	483	37
	Services	1750	545	483	144
	Software	1750	420	483	137
	Telecoms	1750	295	483	81
Stage Dummies	Start-Up (omitted)	748	97	483	66
	Development	748	273	483	161
	Beta	748	93	483	63
	Shipping	748	168	483	112
	Multiple	748	62	483	39
	Profitable	748	55	483	42
New Variables	PATENTS (Had any patents 1 = "yes")	726	309	469	202
	USEFUL (Patents Useful? 1 = "yes")	726	252	469	157
	SOPHIST (Sophisticated investor =1 if investor had "a lot" of management experience and/or if investor had more than 10 other firms in the same industry in their investment portfolio)	710	312	459	193
	SALEEXIT (Expectation of Acquisition Exit; 1 = "yes")	689	266	437	184
	MGTREPLACE (Management replacement either recommended or required by investors)	677	163	432	114

Table 2: Analysis of Management Index

	A	B	C	D
Dependent Variable:	Log of Pre-Money Valuation	Log of Amount Raised	MgtIndex	Mgt. Rplcmnt.
Estimation:	Robust OLS	Robust OLS	GLS fixed effects (within)	Robust Logit
Constant	13.077*** (0.000)	14.010*** (0.000)	406.74*** (0.000)	-1.922 (0.915)
MgtIndex	0.053*** (0.000)	0.087*** (0.000)	--	-0.080* (0.079)
Portion of VC funding	--		0.659** (0.015)	0.007* (0.083)
Industry Index	--	--	--	-0.064 (0.814)
Log of Quarterly Revenue	--	--	--	-0.007 (0.805)
Log of VC Inflows	--	--	--	-0.063 (0.943)
Log of Employees	--	--	--	-0.334** (0.031)
NumSvcs	--	--	--	0.118*** (0.008)
Round and Stage Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	No	Yes
#Obs	483	699	707	325
R^2 or pseudo R^2	0.404	0.200	0.422	0.972
F-Stat or Wald Chi^2 or Chibar^2	39*** (0.000)	12*** (0.000)	26*** (0.000)	29* (0.094)

Note: *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

Table 3: Ownership Ratio
(Dependent variable: amount raised/valuation; robust OLS)

	A	B	C	D	E
Constant	2.632**	1.595	1.595	1.728	2.615*
	(0.016)	(0.178)	(0.181)	(0.153)	(0.051)
Industry Index	0.032	0.027	0.021	0.028	0.034
	(0.415)	(0.475)	(0.575)	(0.457)	(0.382)
Log of Employees	0.021	0.016	0.020	0.020	0.021
	(0.168)	(0.291)	(0.242)	(0.214)	(0.186)
Log of Quarterly Revenue	0.001	0.001	0.001	0.000	0.001
	(0.665)	(0.857)	(0.867)	(0.924)	(0.799)
Log of VC Inflows	-0.225*	-0.120	-0.116	-0.131	-0.224
	(0.096)	(0.332)	(0.350)	(0.298)	(0.103)
MgtIndex	-0.010**	-0.010**	-0.010**	-0.010**	-0.010**
	(0.033)	(0.036)	(0.036)	(0.026)	(0.042)
NumSvcs	0.015***	--	--	--	0.011**
	(0.001)				(0.013)
Sophisticated Investor	0.060	--	--	--	0.060 *
	(0.080)*				(0.066)
U.S.	--	0.087***	--	0.112***	0.086**
		(0.004)		(0.001)	(0.019)
Common Law legal origin	--	--	0.021	-0.055	-0.048
			(0.566)	(0.187)	(0.280)
Round, Industry, and Stage Dummies	Yes	Yes	Yes	Yes	Yes
#Obs	220	259	259	259	220
R²	0.215	0.163	0.134	0.169	0.234
F-Statistic	3.03***	2.63***	2.14***	2.61***	2.92***
	(0.000)	(0.004)	(0.005)	(0.000)	(0.000)

Note: *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level