

CEO Compensation in Private Entrepreneurial Firms

Ola Bengtsson
College of Business
University of Illinois at Urbana-Champaign
Champaign, IL 61820
Tel.: 216.244.2784
ola@illinois.edu

John R. M. Hand
Kenan-Flagler Business School
UNC Chapel Hill
Chapel Hill, NC 27599-3490
Tel.: 919.962.3173
hand@unc.edu

We hypothesize that because fast-growing young companies must raise money in private capital markets that contain significant financing frictions, the CEOs of such firms will be compensated for successful fundraising. Using a sample of 1,585 private venture-backed U.S. firms, we find that the cash pay of entrepreneur-CEOs is increasing in both the quantity and quality of financing secured and is more sensitive to successful fundraising the more challenging and difficult is the fundraising task. Successful fundraising also increases the gap between the pay of CEOs and other executives. Finally, we show that while VC financing dilutes the CEO's fractional equity ownership, it increases the dollar value of that ownership.

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1. Executive summary

The successful raising of external capital is critical for the survival and growth of many companies. In this paper we propose that fundraising is an especially difficult and personally costly task for the CEOs of innovative startups because such firms face private capital markets that are often characterized by severe illiquidity and information frictions. Using the Holmström (1979) principal-agent framework, we develop and test the hypothesis that CEOs of young private firms will be compensated for successful fundraising in addition to successful operating performance, as has been shown for mature publicly traded firms. For venture-backed U.S. firms, we report a range of empirical results that robustly support this hypothesis.

We focus on venture-backed companies because we posit that relative to other types of entrepreneurial firms, the intangible and fast-growing nature of venture-backed companies is associated with a high demand for external financing and also significant supply-side fundraising frictions. Using data from proprietary surveys conducted by VentureOne over the period 2002-2006, we create a large panel dataset that includes detailed information about CEO compensation for 1,585 private U.S. venture-backed companies. We study both equity and cash compensation, but we focus our attention on CEO cash pay because the VentureOne surveys do not reveal detailed data on equity grants and vesting schedules.

Our empirical tests demonstrate that in a cross-sectional regression analysis with controls for company location, industry, size and operating performance, CEO cash pay is indeed reliably higher in firms that have successfully raised more VC financing and higher quality VC financing. We further show that the positive relation between CEO cash pay and fundraising is more pronounced when the successful raising of venture financing is harder because the firm's operating performance is worse. We also find that successful fundraising increases the gap between the CEO's pay and that of other employees, as would be expected if CEO skill and effort are primarily responsible for successful fundraising.

The robustness tests that we undertake lead us to rule out several alternative explanations for our findings, including the possibility that CEOs simply pay themselves more when more money becomes available, or that higher quality CEOs are attracted to higher performing firms, or that unobservable company and/or CEO characteristics drive our findings. We also reject the possibility the observed link between CEO pay and fundraising success is the result of firms

substituting away from equity compensation toward cash pay after a financing round simply because the firm has more cash available.

Overall, our study contributes to the already large literature on executive compensation by analyzing an important set of firms that have hitherto received little attention—private venture-backed companies. Moreover, we theoretically motivate and empirically test the novel idea that CEOs of such firms will be compensated for successful fundraising. And by looking “under the hood” of venture-backed firms, we contribute to the growing number of studies that investigate the economics of VCs and the companies that they fund.

2. Introduction

The majority of innovative fast-growing start-up businesses need external financing to survive and flourish. However, in contrast to public companies that operate in typically low-friction capital markets, young firms are largely confined to raising money from private capital markets that are often characterized by severe illiquidity, information, and agency problems. The thesis of our study is that entrepreneur-CEOs who successfully raise external financing in private capital markets will be rewarded with higher pay because identifying investors and convincing them to make risky investments in such markets requires considerable time, skill, and costly actions on their part.

We motivate the link between CEO pay and fundraising success through Holmström’s (1979) principal-agent framework. In an extension to Holmström’s model, we argue that fundraising can constitute either an observable value-adding CEO task or an informative signal about other unobserved CEO actions. From this perspective we derive the hypotheses that CEO cash compensation will be higher for in private venture-backed firms that have raised higher quantity and quality of venture capital financing. We also hypothesize that the sensitivity of CEO pay to fundraising success will be more pronounced when fundraising is a more difficult and a more vital CEO task.

We emphasize that the proposition that CEOs will in certain circumstances be compensated for successful financing activities—not just for successful operating or investing activities—is new to the executive compensation literature that has historically focused its compensation lens on CEO pay in publicly traded firms. Our argument that optimal employee compensation contracts should reflect the financing environment facing a firm is a novel one.

We test our pay-for-financing hypotheses using a large sample of U.S. venture-backed firms. Venture-backed firms have an especially voracious demand for external financing and confront thorny financing frictions because the intangible nature of their key assets creates large information asymmetry frictions between the firm and suppliers of capital (Gompers and Lerner, 2000). Adding to this is that the new technologies that venture-backed firms focus on require large, rapid, and risky investment outflows into R&D and intellectual human capital, and the often nascent state of the product markets toward which their new products are targeted mean that positive cash inflows from monetizing such investments often lag years behind.

The dataset we employ is a set of proprietary surveys conducted by VentureOne that cover the period 2002-2006 and span 1,585 private U.S. venture-backed firms. The dataset is robust in that the firms in it are not limited to those that eventually go public or are successfully acquired. We focus mostly on the yearly cash pay given to the CEO rather than equity compensation because VentureOne's dataset does not contain data on yearly stock and/or stock option grants or vesting schedules. However, our data validate the importance of cash pay in that median yearly CEO cash pay, when aggregated over about five to seven years (the approximate time a successful venture-backed firm spends between its first financing round and exit), has the same dollar value as the CEO's equity ownership.¹

From univariate comparisons of the evolution of compensation as the company secures new financing rounds, we show that the CEO of a firm that has raised its first venture financing round receives a median of \$186,000 in cash pay and holds a median of 10% of the firm's fully diluted equity, worth about \$185,000, while the CEO of a company that has raised its seventh venture financing round earns a median of \$277,000 in cash pay and holds 5% of the firm's fully diluted equity, worth about \$1.7 million.

Our multivariate cross-sectional regressions that control for company location, industry, and firm operating performance confirm the univariate indications and provide detailed evidence of the effect of different measures of fundraising success on compensation. In particular, we find that firms that have raised larger amounts of VC financing and attracted higher quality VCs reward their CEOs with greater annual cash pay. The importance of fundraising is illustrated by our finding that the elasticity on fundraising quantity is of similar in magnitude to that on the

¹ The value within this range depends on which specific cash flow rights are attached to the VC's preferred equity, and the tax status of cash pay, founder stock, and stock options.

number of firm employees (between 7% and 9%), and the elasticity on fundraising quality similar to that on firm revenues (about 2%).

This key result is robust to controlling for a variety of CEO characteristics, including their being only recently hired, being also Chairman of the Board, being a founder, and having prior CEO experience in a venture-backed firm. We view the last control as noteworthy because VCs cite prior young-company success as a key managerial quality they seek in a CEO, and therefore presumably an attribute they are willing to pay more to secure. However, our results indicate that the positive relation between CEO pay and successful fundraising is not simply a reflection of higher CEO quality.

Having found broad support for our first hypothesis, we then test our second hypothesis that CEO pay will be more sensitive to successful fundraising for firms where attracting venture funding is particularly difficult yet key to survival. Using poor operating performance (measured by relatively low revenues and/or few employees as a proxy for the difficulty and importance of fundraising) we find that the elasticity of fundraising on CEO cash pay is indeed significantly higher in companies that have weak operating performance.

We then turn to assess the validity of alternative explanations for our primary results. The first explanation we study is that CEOs have sufficient power to simply pay themselves more when more money becomes available in the form of a new round of funding. We find evidence inconsistent with this explanation in that even for firms in which VCs hold virtually all the power (viz., VCs own more than 50% of the equity and the CEO owns less than 6%), we observe a reliably positive relation between CEO cash pay and financing success.

The second explanation we examine is that the significantly positive elasticity of CEO cash pay with respect to fundraising success may be biased because one or more unobserved factors influences both compensation and fundraising. We present evidence against this view in two separate empirical tests. First, we show that companies that have attracted larger amounts of venture funding have a more pronounced difference between the CEO's pay and the pay of other employees. This indicates that the association between fundraising and CEO compensation holds even after controlling for unobservable factors that are constant within a firm and affect the compensation to all employees in a similar way. Second, at the cost of a substantially reduced sample size we analyze the time-series of changes in CEO pay. In doing so we find that CEO cash pay increases considerably when a company raises capital, and this increase is larger the

larger the amount raised. Our time-series analysis, which controls for unobserved factors that are constant for a given firm over time, indicates that the effect on fundraising is immediate in that cash pay does not increase for CEOs who raised capital in earlier years.

Lastly, we empirically assess how CEO equity ownership is linked to fundraising. Due to data limitations we can only test how the CEO's ownership stake and the dollar value of this equity holding are determined. We find that the positive elasticity of CEO cash pay with respect to financing success does not reflect a negative elasticity of CEO equity pay with respect to financing success. That is, although fundraising dilutes the CEO's percentage ownership, it typically increases the dollar value of that stake. The elasticity for equity ownership is about 50%, which is far higher than the elasticity of between 7% and 9% that we find for cash pay.

In total, we believe that our findings contribute to both the fields of entrepreneurship and executive compensation by showing that the entrepreneur-CEOs of innovation-intensive venture-backed companies are compensated for successfully raising new equity in the illiquid and friction-filled private capital markets they face. While a similar type of pay-for-performance relation has been observed for not-for-profit organizations (Baber, Daniel and Roberts, 2002; Core, Guay and Verdi, 2006), our study is the first to analyze the rewards to financing in private young companies, where little is known as compared to publicly traded firms (Cole and Mehran, 2008). By analyzing the impact of equity financing on CEO pay, our work is related to papers that study the interaction between compensation and capital structure decisions (Mehran, 1992; John and John, 1993; Berger, Ofek and Yermack, 1997; Berkovitch, Israel and Spiegel, 2000). However, the private venture-backed firms that we study typically have little or no debt. Our results are therefore unlikely to be explained by an indirect effect arising from a changing capital structure, but instead reflect a more direct association between CEO pay and fundraising success.

We also add to research into the economics of private venture-backed firms (Baker and Gompers 1999; Hellmann, 2000; Hellmann and Puri, 2002; Hsu, 2004; Wasserman, 2006; Kaplan, Sensoy and Strömberg, 2007; Puri and Zarutskie, 2007; Chemmanur, Krishnan and Nandy, 2007) by focusing on CEO compensation during the early stages of such firms' lives. Our findings complement those of earlier studies on VC governance by showing that VCs use both cash and equity compensation to align the CEO's incentives with those of equity investors.

The remainder of the paper is organized as follows. Section 3 summarizes the theory underlying our hypothesis and contextualizes it within the key literatures of entrepreneurial

finance and executive compensation. Section 4 describes the data we use, while Section 5 presents a variety of summary statistics on CEO compensation. Section 6 reports and discusses our primary empirical results on CEO cash pay, together with a battery of robustness tests. Section 7 presents analyses pertaining to CEO equity compensation and ownership. Our summarizing discussion concludes in Section 8.

3. Theoretical motivation

3.1 *Holmström's (1979) principal-agent model applied to private venture-backed firms*

Our theoretical starting point in motivating a connection between CEO pay and financing success in private venture-backed firms is Holmström's seminal model of the principal-agent problem that arises in external financing situations (Holmström, 1979).²

In the Holmström model, the CEO (agent) can take one or more actions a that increase firm performance x but require costly personal effort on the CEO's part. Since investors (principals) cannot directly observe the CEO's actions, the optimal compensation contract ties the CEO's compensation $s(x)$ to observable performance measures and other signals. Relevant performance measures should be maximally correlated with the firm's success in order to induce optimal CEO behavior and minimize risk-sharing costs. Formally, using Holmström's notation:

$$\begin{aligned} s(x) &\geq s_{\lambda}(x) \quad \text{on} \quad X_+ = \{x \mid f_a(x,a) \geq 0\}, \\ s(x) &< s_{\lambda}(x) \quad \text{on} \quad X_- = \{x \mid f_a(x,a) < 0\} \end{aligned} \tag{1}$$

where $s(x)$ is the optimal compensation given that action a is unobservable (i.e., the second-best solution to the optimal compensation contract) and $s_{\lambda}(x)$ is the optimal compensation if a is observable (i.e., the first-best solution). The derivative $f_a(x,a)$ captures the informativeness of x as measured by the degree to which a given performance measure x is increasing in a .

For private venture-backed firms and large public companies alike, the set of relevant performance measures is likely to include revenues, profitability, and firm size. A large body of literature has validated the real-world relevance of these variables for determining CEO compensation in public companies. In private venture-backed firms, however, we propose that

² One measure of the importance of Holmström's (1979) paper is the observation that its citation count ranks it in the top 0.3% of economics papers (<http://ideas.repec.org/top/old/0802/top.item.nbcites.html>). A model with similar features is derived by Harris and Raviv (1978).

CEO compensation will also be tied to measures that capture how successfully the company has raised financing from VC investors. Within Holmström’s framework, this thesis can be motivated either by fundraising being a value-adding CEO action or by fundraising being an informative signal about other CEO actions. We not turn to outline each possibility.

3.1.1 External fundraising as an observable and contract-relevant CEO action

The first theoretical motivation for why CEO compensation should be tied to fundraising success is that for private venture-backed firms, external fundraising is an observable CEO action (denoted a in Holmström’s model) that improves firm performance but involves costly effort on the CEO’s part. The personal cost to the CEO stems from the fact that startup businesses operate in private financial markets that often manifest information asymmetries, asset/equity illiquidity, and sophisticated suppliers of funds. Combined with the importance of successful financing to the survival of a young high-growth firm,³ this makes fundraising a difficult, stressful, and failure-laden task for many CEOs.⁴ VCs turn down the vast majority of all deals presented to them, and entrepreneurs are typically gifted with skills of innovation and leadership than finance.

Additional to our primary hypothesis, we also argue that the CEO’s fundraising task is all the more difficult—yet all the more important—when the firm is performing poorly. This is because poor performance is more likely to make it harder for the CEO to convince VCs to make an investment, yet without the investment the firm is less likely to survive.

3.1.2 External fundraising as signal of CEO actions

A positive relation between CEO pay and fundraising success could also be theoretically obtained via the argument that fundraising is an informative signal y about the value-enhancing actions the CEO has undertaken. As derived by Holmström, if y is not a sufficient statistic for x , then the optimal contract takes the form $s(x, y)$ rather than $s(x)$. That is, we argue that CEO compensation will be increasing in both the performance measure x and the fundraising signal y .

³ New technologies usually call for large, rapid, and risky investments in R&D and intellectual capital, but the unformed nature of the markets toward which sales are targeted typically mean that operating cash inflows lag far behind the investment outflows.

⁴ For example, by virtue of their position CEOs lead the firm. They usually travel to and head up all important meetings with potential VCs, and they may bear the personal cost of embarrassment and stigma if financing pitches fail for whatever reason (whether attributable to their mistakes or limitations, or those of their subordinates).

We hypothesize that for venture-backed private companies, the quantity and quality of financing can be a more reliable, more credible signal of firm value-creation than either revenues or profits. Not only are the typical R&D and human capital assets of a venture-backed company intangibles whose value derives from long-term expected cash flows—perhaps making near-term profits poor predictors of ultimate equity value—but the “immediately expense, never capitalize” rules that dictate how firms’ must account for their intangible assets are such that venture-backed firms’ reported profits are biased measures of performance. However, in contrast to operating metrics like revenues, reported profits, or the number of employees, which are somewhat under the control of the CEO, the sophistication of VC suppliers of capital suggest that the amount of capital a firm raises cannot be deliberately mistimed, distorted, or fudged by the CEO.

We extend this line of argument by also proposing that the informativeness of the fundraising signal y will be decreasing in the firm’s operating performance. This is because worse current-period firm performance is likely on average to be predictive of worse future firm performance. Thus, sophisticated VCs will only supply the same amount of financing to a currently low-performing firm and a currently high-performing firm if they (on average correctly) assess the currently low-performing firm’s future performance to be improving to the level of the currently high-performing firm.

3.2 *Ex-ante vs. ex-post contracting*

The above discussions based on the Holmström model lead us to propose that there will be a positive association between compensation and fundraising success, and that that association will be higher for firms with weaker current operating performance. We note, however, that the Holmström model assumes ex-ante contracting—that is, investors commit to the compensation contract before the CEO takes any actions. However, the predictions in the above discussion could also be derived if investors do not write contingent compensation contracts but instead give the CEO an after-the-fact reward for successful financing. Why would investors give CEOs such rewards? One possible answer is the CEO’s opportunities in the external labor market. If fundraising requires costly and skillful effort and is value-enhancing to investors, then a CEO who successfully secures VC financing should become a more valuable CEO candidate to other private firms. Anecdotal evidence from the VC community indicates that many VC-backed companies view a proven fundraising track record as one of the most

important traits a CEO can have. Thus, CEOs who successfully raised venture capital have stronger ex-post bargaining power and will consequently on average negotiate a higher salary as compared with CEOs who have not raised such capital. As such, the prediction from the Holmström model that compensation is increasing in fundraising success can also be derived in an ex-post bargaining game.

3.3 Cash and equity compensation

Our arguments for why CEO compensation in private venture-backed companies should be increasing in fundraising success are not specific as to whether compensation is equity, cash pay, or both. A natural prior for CEO compensation in private venture-backed companies is that CEOs will be compensated and incentivized through stock and/or stock options, since equity strongly motivates a CEO to achieve a rapid and successful IPO or acquisition for the VC. Without denying the relevance of equity, we nevertheless propose that *cash pay* will (also) be used to give the CEO substantial incentives to undertake value-enhancing fundraising actions.

The efficacy of cash salary and bonuses in startups stems from three shortcomings of equity incentives. First, a large fraction of venture-backed firms fail. Even if the company were to become moderately successful, the contract terms that are added to the preferred stock typically give VCs a disproportionate fraction of ultimate cash flows (Kaplan and Strömberg, 2003). This makes equity a risky, noisy, and costly form of CEO compensation (Holmström, 1979). In contrast to this, cash pay is far less risky, and it is not at all noisy. Second, the CEO cannot fund his current consumption from stock or vested options because such equity can rarely be sold prior to a venture-backed firm's exit. In contrast, cash pay suffers from no such limitation. Finally, even though a terminated CEO typically keeps a portion of his unvested shares, the value of such shares may be heavily diluted by future rounds of financing. Cash pay, on the other hand, is kept once earned and received.

3.4 Primary hypotheses expressed as a linear approximation

The analysis above leads us to propose that there are good theoretical grounds undergirding the prediction that the CEO of a venture-backed firm will be rewarded with higher cash pay for raising venture capital. We therefore predict that CEO cash pay will be increasing

in operating performance measures, such as company size, revenues and profitability, and in the degree of fundraising success measured by both quantity and quality of venture financing:

Hypothesis H1: Within the linear approximation of equation (1) described by equation (2) below, we predict that $\beta_1 > 0$ and $\beta_2 > 0$.

$$CEO_Cash_Comp_{it} = \alpha + \beta_1 Operating_Performance_{it} + \beta_2 Fundraising_Success_{it} + \varepsilon_{it} \quad (2)$$

where $CEO_Cash_Comp_{it}$ is the cash compensation of the CEO of firm i in period t , $Operating_Performance_{it}$ is the measured operating performance of firm i in period t , and $Fundraising_Success_{it}$ is VC funding raised by firm i in period t .

The second hypothesis following from our theoretical discussion is that the empirical association between CEO compensation and fundraising will be more pronounced the weaker a firm's current-period operating performance. This follows from our arguments that fundraising is more difficult for the CEO but also more important when the company has no current revenues or tangible assets, and that fundraising is for such companies a more informative signal of CEO actions. Thus:

Hypothesis H2: In equation (3) below, we predict that $g_3 < 0$.

$$CEO_Cash_Comp_{it} = \phi + \gamma_1 Operating_Performance_{it} + \gamma_2 Fundraising_Success_{it} + \gamma_3 [Operating_Performance_{it} \times Fundraising_Success_{it}] + v_{it} \quad (3)$$

We now turn to describe the data we use to empirically test hypotheses H1 and H2.

4. Data

4.1 Sample

Our dataset comes from detailed surveys conducted by VentureOne, a primary worldwide provider of data on VC investments and VC funds.⁵ A total of eight CompensationPro™ surveys covering the period 2002–2006 make up our sample.⁶ In each proprietary survey, VentureOne emailed a multipage, web-based compensation questionnaire to the approximately 7,000 venture-

⁵ The authors were generously granted access to VentureOne's data after signing strict nondisclosure agreements.

⁶ The surveys are spring 2002, spring and fall 2003, spring and fall 2004, spring and fall 2005, and spring 2006.

backed U.S. companies in its financing database that were classified at the time as being private and independent. The questionnaire asked companies to provide a broad set of compensation- and business-related information. Companies were asked to report the dollar values of the base salary, bonuses, and other cash compensation of every employee together with their title (up to a maximum of 50 people from the most senior person down); the total shares of founders' stock and exercised and unexercised options that each held; and the total fully diluted and common shares the companies had outstanding. In terms of business information, VentureOne asked each company to provide actual revenues for its most recent fiscal year; expected revenues for its current fiscal year; the number of employees at the end of its most recent fiscal year; the number of employees it expected to have at the end of its current fiscal year; and annual workforce turnover in the most recent fiscal year. Companies were also asked to indicate the number of employees in each of seven departments and yes/no responses to each of seven Compensation Guideline queries.⁷

As reported in Table 1, panel A, a total of 2,975 venture-backed companies responded to at least one VentureOne survey, yielding compensation data on 61,005 executive-survey pairs. We limit our sample to CEOs or Presidents (we denote such executives as CEOs). For firms that responded to both spring and fall surveys in a given year, we use only the spring survey.

<< Table 1 about here >>

We then match the compensation survey data to VentureOne's financing and general support databases. To be included in our final sample, a company needed to provide information about location (U.S. state), industry, prior-year revenues and employees, and equity ownership for both the CEO and VCs as a group. Also, each firm must have closed at least one seed or VC financing round prior to the survey date.⁸ Companies were excluded if one or more VC investors could not be identified, if the financing amount of the last round was not disclosed, if data were obviously incorrect, or if the firm was founded before 1980.

⁷ The departments listed in VentureOne's compensation survey were Administration, Sales, Marketing, Technical, Business Development, Finance, and Other. The Compensation Guideline queries asked for a yes/no response to the following questions. [1] Does your company have a formal pay structure (pay ranges by position type)? [2] Does your company have an established stock grant guideline? [3] Does your company have a formal sales commission plan? [4] Does your company provide bonuses? [5] Does your company have a defined bonus plan? [6] Does your company have a discretionary bonus plan? [7] Does your company provide hire-on bonuses? If so, to which titles? (a drop-down menu listed the available titles from which to choose).

⁸ Firms for which the last VC round was number 7 or more were excluded, because such companies are likely to have different characteristics than startup-type venture-backed firms.

The final sample comprises 2,816 observations from 1,585 companies. Panel B tabulates the final sample by survey year. Some firms list more than one CEO or list both a president and a CEO. As shown in Panel C, the majority of sample firms participate in exactly one or two surveys. Imposing the additional restriction that the firm disclose its pre-money valuation at its last VC financing round reduces the dataset to 1,247 observations from 755 companies. We use the latter subsample when calculating the implied value of the CEO's equity ownership.

4.2 *Selection biases*

The fact that these compensation and performance data are collected from surveys that are only sent out to, and completed on a voluntary basis by, U.S. venture-backed firms may lead to selection biases and/or inferential biases. While we make no representation that our findings and inferences generalize beyond U.S. venture-backed firms, we are unable to empirically measure the magnitude of any biases that may be present. This said, three considerations lead us to conjecture that selection bias is unlikely to materially affect the inferences we draw from our tests as they pertain to the population of U.S. venture-backed firms. First, our sample of 1,585 companies covers a substantial proportion (approximately 20%) of U.S. venture-backed companies in the period 2002-2006. Second, by including geographical location and industry as dummy variables in our regressions, we control to some degree for selection effects related to these factors. Lastly, while it is possible that the VentureOne dataset oversamples companies with good operating and/or financial performance, we believe it is unlikely that such oversampling would be confined to companies with both good performance and high CEO compensation. Thus, whereas the potential oversampling of successful companies in our sample could lead to an overstatement of the average and median compensation levels, we suggest that it is unlikely to affect cross-sectional regression results.

4.3 *Descriptive statistics for general variables*

We report descriptive statistics for non-CEO-compensation variables in Table 2, panel A. The identity of the CEO is not revealed in the surveys, but we are able to determine whether the CEO is a *Founder*; is currently *Chairman of the Board*; or was *Hired in Prior 6 Months*. CEO

turnover is low, in that only 5% of CEOs are hired in the six months leading up to the survey. Almost half of all CEOs (42%) are founders and 5% served as Chairman of the Board.⁹

<< Table 2 about here >>

VentureOne asks companies to provide data on how many *Employees* they have at the end of the calendar year prior to the survey. We match each such interval with the median number of employees from a subsample in which the actual number of employees is known. The variable *Revenues* in the previous calendar year is only given in dollar intervals, and we translate each survey response to the median value for each such interval. The companies also report whether they are *Profitable*, but they provide no numerical estimate of the magnitude of their net income (or loss).¹⁰ The average *Company Age* is 3.7 years at the time of the survey.

The surveys do not ask for data about VC financing, but VentureOne collects such data from other public and private sources. We identify the last seed or VC financing round prior to the survey date, and from it we create a *Round Number* variable that is equal to 1 for a seed stage round, 2 for the first VC round, 3 for the second VC round, and so on. As of the survey date, the typical company had closed its second VC round. Two variables were created that measure the amount of financing that the company had received. *VC Financing Raised in Last Round* is the financing the company received in its most recent round of VC financing. The average amount for *VC Financing Raised in Last Round* is \$11.7 million, reflecting a right-skewness with several companies having raised more than \$100 million. In addition, the variable *VC Financing Except Last Round* measures the cumulative amount of financing received from VCs and other investors in all rounds prior to the last round of VC financing, including rounds in which only corporate VCs participated, non-VC rounds such as debt financing, etc.

Next, we create a variable that captures the quality of VC financing. As shown by Seppä (2003), Sorensen (2007), and Hochberg, Ljungqvist and Lu (2007), the number of portfolio companies in which the VC had ever invested, as of the survey date, is a good prediction of a VC's ability to add value to a company. We create this variable and label it *Experience of Lead*

⁹ VentureOne's surveys do not include questions about CEO personal characteristics such as age, gender, education, and prior work experience. The surveys also do not reveal the identity of the CEO.

¹⁰ VentureOne reports the variables *Employees*, *Revenues*, and *Profitable* by interval(s), not their continuous values. As shown by Irwin and McClelland (2003), when two or more intervalled variables are included in a multiple regression, the estimated coefficients on those variables may be biased. However, the direction of such biases cannot be determined without knowledge of the properties of the underlying continuous variables.

VC. The average lead VC in our sample had made 66 unique portfolio company investments. In robustness tests we also use the age and the number of successful exits of the VC as alternative measures of VC experience.

Panel C of Table 2 reports the correlations between company operating and financing performance variables and CEO characteristics. Most correlations are small, with the exception of the correlation of 0.64 between *VC Financing Except Last Round* and *Round Number*.¹¹ The predominance of low correlations among variables means that estimated regression coefficients are unlikely to be distorted by multicollinearity concerns. We confirm this expectation in section 6.1, where we report finding low variance inflation factors for regression coefficients.

5. Univariate findings

5.1 CEO cash compensation

CEO total compensation has two major components—equity ownership and cash pay. Neither fringe benefits nor lavish pension plans are a major part of CEO compensation for the type of firms we study (Hand, 2006). VentureOne’s surveys ask each company to give detailed information on the *Base Salary*, *Bonus*, and *Other Compensation* elements of CEO cash compensation. We define *CEO Total Cash Compensation* to be the sum of these parts, and use it as our primary measure of CEO cash pay. In doing so, we note that *CEO Total Cash Compensation* excludes non-cash compensation such as stock option grants and share grants.

In Table 2, panel B we report descriptive statistics for CEO total cash compensation. The average amount of *CEO Total Cash Compensation* is \$246,000 per year, of which \$35,000 (14%) is in the form of a *Bonus*. As shown in Table 3, the CEO of a firm that has raised its first round of venture funding earns on average total cash compensation of \$189,000, while the CEO of a firm that has successfully raised a 7th financing round earns \$280,000. Bonuses are paid to CEOs about half the time. *Other Compensation* averages only \$2,000 annually.

<< Table 3 about here >>

Figure 1 displays a histogram of *CEO Total Cash Compensation*. Not unexpectedly, the distribution of *CEO Total Cash Compensation* is right-skewed, with the skewness arising almost

¹¹ This high cross-correlation is not surprising because companies that have raised financing in more rounds of venture financing are on average also likely to have raised larger amounts.

entirely from the *Bonus* component. When we do a similar plot of *Bonus*, we find that 49% of observations are zero, with the remaining 51% clustered at smaller, not larger, values.

<< Figure 1 about here >>

Since most previous analyses of CEO pay have focused on public companies, we contrast the total cash compensation earned by CEOs of venture-backed firms with that earned by CEOs of similar companies that are publicly traded. We use *CapitalIQ* to obtain compensation data for CEOs of life science and high-tech companies, the two major industry groups in our sample of private venture-backed firms. The average benchmark public company CEO receives \$791,000 in *Total Cash Compensation*. This is 221% more than the average venture-backed company CEO in life science or high-tech industries), including 104% more in *Base Salary* and 735% more in *Bonus*. We then restricted the benchmark sample to companies that went public in the last five years and were venture-backed prior to their IPO. For such firms, the average CEO received \$519,000 (111% more) in *Total Cash Compensation*—66% more in *Base Salary* and 307% more in *Bonus*. These differences are even smaller when the benchmark sample is limited to public companies with revenues of less than \$50 million—the CEO made \$420,000 in *Total Cash Compensation*, or 70% more than the average CEO of a private venture-backed company. Overall, the comparison with public-company CEOs indicates that the CEOs of venture-backed firms earn less cash compensation but that a large part of this difference is due to firm size. While both *Base Salary* and *Bonus* are higher in public companies than in venture-backed companies, this difference is significantly more pronounced for *Bonus*.

5.2 *CEO Equity Compensation*

While the data on cash compensation are very detailed, much less information is available on equity compensation. VentureOne's survey does not ask companies to provide information on the stock options and vested shares they have granted to individual employees. Thus, we are unable to calculate the yearly change in the CEO's equity ownership. Even if data on options and equity grants were available, it would be difficult to separate out the part of such compensation that pertains to current-period performance from the part that pertains to dilutive

events, from the part that follows from a predetermined vesting schedule.¹² Moreover, even if it were possible to separate out the work compensation portion of option and equity grants, that portion would be hard to value with much precision. This is because the companies are private and do not have common equity values that are set in a liquid market on a regular basis.¹³ Due to these limitations, we are constrained in our ability to analyze the equity part of CEO total pay.

VentureOne's surveys do ask firms to report the fraction of total fully diluted firm equity held by the CEO, which we denote as *% Equity Ownership of CEO*. This variable is calculated by dividing the sum of all options and shares owned by the CEO (assuming all options are exercised and all shares vested) with the total number of outstanding shares (common plus preferred, again assuming that all options are exercised and all shares are vested). The average percentage of fully diluted equity held by CEOs in our sample is 9% (see Figure 2), an amount that is significantly lower than the 19% CEO ownership for venture-backed companies found by Baker and Gompers (1999). The difference likely reflects the fact that the sample of Baker and Gompers includes only companies that go public, while our sample includes all types of venture-backed firms. Capital IQ does not report equity ownership by the CEO, so we are unable to benchmark the fractions found in our sample against those of public companies.

<< Figure 2 about here >>

We define *Implied Value of Equity Ownership* as the product of *% Equity Ownership of CEO* and the post-money valuation of the most recently completed VC round. *Implied Value of Equity Ownership* can be calculated for less than half of our sample. The mean CEO implied ownership value is \$4.63 million, but the median is substantially lower at \$1.70 million. Thus, for the median CEO, annual cash compensation represents about 13% ($\$240,000/\$1,666,000$) of the dollar value of the equity ownership.

It is important to note that the calculated *Implied Value of CEO Equity* overstates the dollar value to the CEO because it is calculated using the post-money valuation of the company, which due to the specific cash flow rights held by VCs is lower than the actual valuation of the

¹² Following a new financing round, executives are often allocated stock options to compensate for the dilution of cash flow rights that follows from the newly issued preferred stock with attached liquidation preferences.

¹³ Equity prices based on arm's-length transactions between venture-backed private firms and investors are typically only observed at formal financing rounds. Such financing rounds usually occur one to two years apart. This makes estimating the firm-specific inputs of standard option valuation models (the level of the firm's stock price and the volatility of the returns on the firm's common stock) very difficult.

company. To see this, consider a company that has a post-money valuation of \$10 million, has received a total of \$5 million in venture funding, and has 10% in CEO ownership. Kaplan and Strömberg (2003) report that 38% of VCs hold “participating” preferred stock, which means that investors get paid back their investment amount before any distributions are made to common stockholders. If this fraction applies to our example and the company is sold for \$10 million, then the value of the CEO’s equity is not \$1 million (10% of \$10 million) but \$810,000 (10% of \$10 million – [0.38 x \$5 million]). For our sample, similar assumptions would imply that the median dollar value of the equity ownership is \$1.1 million, or about 22% of the yearly total cash compensation (\$240,000/\$1,100,000). Calculations such as these are clearly imprecise, because they rely on strong assumptions about both contract structure and distribution of company outcomes, however, they illustrate the point that the true value of the CEO’s equity ownership in venture-backed firms is significantly lower than the *Implied Value of CEO Equity*, which is calculated without taking into account the cash flow rights attached to VC preferred stock.

We next turn to multivariate cross-sectional and time-series tests of the predicted link between CEO compensation and fundraising success. In the next section, we discuss results related to cash compensation, and results on equity ownership are presented in Section 8.

6. Multivariate results on CEO compensation and venture fundraising

6.1 Success in raising equity financing

Table 4 reports the Pearson correlations among the main independent variables (panel A) and the results of OLS regressions for which the sample includes our full panel and the dependent variable is *CEO Total Cash Compensation* (panel B). We begin by testing whether CEO total cash compensation is increasing with fundraising success without considering the impact of operating performance. Then in section 6.2 we expand our test to both control for and exploit variables that capture operating performance and CEO characteristics.

All dollar-denominated variables are logged so as to yield coefficient estimates that are elasticities and to mitigate the impact of outliers. To reduce the likelihood that standard errors will be affected by time-series correlation, regression residuals are clustered by company.¹⁴ All specifications but one incorporate state and industry dummies to control for systematic

¹⁴ See Petersen (2006) for an overview of solutions to estimation problems in panel datasets.

differences in CEO labor markets, firms' production functions, investment opportunity sets, and characteristics of local VC markets. Also, all specifications include year dummies to control for common macroeconomic factors.

To test hypothesis H1 we employ several different proxies for successful fundraising. The most primitive measure is *Round Number*, the number of times the company has received VC financing. As suggested by Table 3's descriptive statistics, model 4.1 shows that at the univariate level *CEO Total Cash Compensation* is strongly increasing in *Round Number* per se (t -statistic = 10.4).

<< Table 4 about here >>

Given that *Round Number* could well also be seen as a proxy for prior successful operating—rather than financing—performance, our more direct proxies for financing success are the quantity of equity raised, *VC Financing Raised in Last Round*, and *VC Financing Except Last Round*. *VC Financing Raised in Last Round* is the amount raised by the firm in its most recent round prior to the VentureOne compensation survey date. *VC Financing Except Last Round*, which is our primary measure of fundraising success, is the amount raised in all previous VC rounds except the last. Due to the greater temporal proximity of *VC Financing Raised in Last Round* to the CEO who is in place at the survey date, we expect that the coefficient on *VC Financing Raised in Last Round* will be larger than that on *VC Financing Except Last Round*.

The Pearson correlations in panel A indicate that few of the independent variables are highly correlated, suggesting that multicollinearity is unlikely to create difficulties in interpreting regression coefficients. The average absolute correlation is 0.12, and the highest correlations are between *Employees* and *Revenues* (0.69) and *Employees* and *Round Number* (0.42).¹⁵

The results reported for model 4.2 supports this prediction. The estimated coefficients on *VC Financing Raised in Last Round* and *VC Financing Except Last Round* are significantly positive (t -statistics of 10.0 and 8.5, respectively) and the elasticity of *Financing Raised in Last Round* (9.9%) is also considerably higher than that of *VC Financing Except Last Round* (1.6%). The magnitude of the estimated elasticity on *Financing Raised in Last Round* means that a CEO whose firm raised about \$4 million in its most recent financing round earns about \$220,000 (\$4

¹⁵ We analyze the effects of potential multicollinearity in robustness section 6.6.1.

million being the 25th percentile amount in our sample), whereas a CEO whose firm raised more than \$15 million (75th percentile) earns about \$270,000.

Our fourth and final measure of fundraising success is the quality of the VC financing. Unlike public equity or debt capital, venture capital is often argued to be “smart money” in the sense that VCs typically add operational value to the firm. Hellmann (2000) and Hellmann and Puri (2002) document that VCs take an active role in helping founders to professionalize management by helping in the hiring of key senior-level business, scientific, and technical personnel. However, the ability to add value differs across VCs. Sorensen (2007) shows that older and more experienced VCs provide greater value to their portfolio companies. Wongsunwai (2007) finds that experienced VCs are more involved in their portfolio companies by taking a larger number of board seats, and Hsu (2004) shows evidence of perceived differences in value addition for different VCs, in that entrepreneurs are more likely to accept offers by more reputable VCs even if such VCs give lower valuations.

If our theoretical argument is correct that CEO pay in venture-backed companies is tied to fundraising success, then this relationship should hold not only for financing quantities but also for the quality of the investor providing the capital. Similar to raising a larger dollar amount, convincing a higher quality VC to provide funding likely requires more work for the CEO, because such investors are in overall greater demand while also being more valuable since they can give the firm more assistance in various forms.¹⁶ Consequently, CEOs of private venture-backed companies should be compensated more if they raise capital from more reputable VCs. This prediction can be formally motivated by the Holmström (1979) model: raising capital from reputable VCs is either a more demanding task or, alternatively, a more informative signal about other CEO actions. We note, though, that since the quality of the VC is positively correlated with both the quantity of financing and measures of firm size, there are econometric challenges to the clean identification of an empirical relation between CEO pay and VC quality. Therefore, our results on VC quality should be interpreted as suggestive rather than definitive evidence supporting our key proposition that CEO pay in venture-backed firms is increasing in fundraising success.

¹⁶ Bengtsson and Wang (2009) present evidence that CEOs and founders of venture-backed companies are aware of such quality differences between VCs.

In model 4.3, we include *Experience of Lead VC* as an additional explanatory variable and find that *CEO Total Cash Compensation* is significantly higher the greater the *Experience of Lead VC* (i.e., the higher the number of companies the VC has invested in). Similar results are found in untabulated regressions in which *Age of Lead VC* and *VC Number of Successful Exits* (IPO or acquisition) are used as proxies for VC quality. The estimated elasticity on *Experience of Lead VC* is, however, relatively low at 1.5%, meaning that a CEO whose firm raised financing from a VC with 7 historical portfolio companies (the 25th percentile in our sample) earns about \$239,000, whereas a CEO whose firm raised financing from a VC with 89 historical portfolio companies (75th percentile in our sample) earns about \$258,000.

6.2 *Financing success controlling for operating performance and CEO characteristics*

The estimated coefficients on our proxies for the quantity and quality of financing success in models 4.1-4.3 may be biased if financing success is correlated with current operating performance and the immediate growth of the company. The descriptive evidence reported in Table 3 suggests that at the univariate level, *Total CEO Cash Compensation* is higher for firms with more *Employees*, *Revenues*, and *Profitability*. On average, *Total CEO Cash Compensation* is \$232,000 for a firm with zero or almost no revenues (< \$0.5 million), but \$307,000 for a company whose yearly revenues exceed \$20 million. Likewise, CEOs of firms with fewer than 10 employees earn an average of \$202,000 in total cash compensation, whereas CEOs of firms with more than 100 employees on average earn \$295,000.¹⁷ The CEOs of profitable companies earn \$261,000, versus \$245,000 if the firm is unprofitable.

We therefore re-estimate model 4.3 after including proxies for the firm's performance in its most recent fiscal year (*Employees*, *Revenues*, and *Profitability*), state and industry fixed effects, the expected one-year-ahead growth in revenues and employees, and CEO employment characteristics. While prior work has taken into account the CEO's educational background (Wasserman, 2006), such data are not included in VentureOne's surveys. We include in models 4.4-4.6 the CEO characteristic variables that are available—whether the CEO was *Hired in the*

¹⁷ One objection to using employee headcount as a positive performance measure is that the CEO could hire more people than needed. While this may be true for an established company, hiring employees for a risky early-stage company is a matching process in which prospective employees have to believe in the company's survival in order to motivate their company-specific investment. Moreover, the more employees the CEO hires, the greater the company's cash burn and so the higher the pressure on the CEO to secure more financing or turn cash-flow positive.

Last 6 Months as CEO, if he/she serves as *Chairman of the Board*, whether the CEO is a *Founder*, and whether the CEO has prior experience as a CEO in a venture-backed firm.

The results from models 4.4 and 4.5 show that the estimated coefficients on both *Revenues* and *Employees* are significantly positive.¹⁸ While *CEO Total Cash Compensation* is reliably associated with current and/or expected one-year-ahead growth in *Revenues* and *Employees*, the estimated elasticities on *VC Financing Raised in Last Round*, *VC Financing Except Last Round*, and *Experience of Lead VC* remain significantly positive. Moreover, consistent with the proposition that *VC Financing Raised in Last Round* and *VC Financing Except Last Round* are economically more refined proxies of the quantity of successful fundraising than is *Round Number*, the coefficient on *Round Number* is no longer significant after controlling for company operating performance. The estimated coefficient on *VC Financing Raised in Last Round* (6.9%) is similar to that on *Employees* (8.3%) and three times as high as the coefficient on *Revenues* (1.9%). Notably, the *Revenues* coefficient is lower in our sample of venture-backed companies than for large public companies—the coefficient on *Revenues* is about 30% for S&P1500 companies (Baker, Jensen and Murphy, 1988). *Profitability* is significant only when the firm’s intangible intensity and/or Tobin’s *Q* is controlled for via the asset-based market-to-book ratio of matched NASDAQ firms (model 4.5).¹⁹

Finally, in model 4.6, for a subset of 511 observations for which we are able to identify the CEO’s name, we examine whether our results on fundraising are caused by differences in CEO human capital. Conversations with venture capital partners strongly indicated that the key professional characteristic venture capital partners are willing to pay more for is if the CEO had significant and successful experience at another venture-backed firm—particularly if the previous firm had experienced a favorable exit such as an IPO or acquisition. However, as indicated by the results of estimating model 4.6, we find no statistically significant effects on

¹⁸ In an unreported regression, the coefficient on *Profitable* is positive and weakly significant when *Profitable* is interacted with *Company Age*. This suggests that while profitability is not an important performance measure early in a private venture-backed company’s life cycle, it becomes more important as the firm matures.

¹⁹ In an untabulated regression we also included *Pre-Money Valuation of Last Round* as a measure of company valuation. This variable is reported in VentureOne for about half our sample (1,247 observations). *Pre-Money Valuation*, which is defined as the value of the company after the infusion of new capital less the dollar value of the new capital, is an important control variable because it captures a range of unobserved operating performance variables. We find that after controlling for pre-money valuation, the estimated coefficient on *VC Financing Raised in Last Round* remains reliably positive. This result should, however, be interpreted with some caution because pre-money valuation is highly positively correlated with our measures of operating performance and fundraising success, which could introduce problems of multicollinearity in the regression analysis.

compensation for CEOs who have previous work experience in a venture-backed company. And importantly, the estimated coefficients on fundraising and operating performance remain significant after controlling for this measure of CEO human capital.²⁰

In summary, we find broad support for our first hypothesis (H1) that CEO pay is tied to fundraising success in private venture-backed firms. This association, which is economically material, is found even after controlling for a range of relevant company and CEO characteristics. We next turn our attention to the testing of our second hypothesis (H2).

6.3 *Interaction between successful fundraising and operating performance*

To test our hypothesis H2 that the elasticity of CEO pay on fundraising will be larger the more difficult and important it is for the company to secure external financing, we use cross-sectional regression specifications similar to those in Table 4, augmented to include operating/financing interactions. The results are shown in Table 5. Regression model 5.1 includes an interaction between *VC Financing Raised in Last Round* and *Revenues*. We note that the estimated coefficient on this interaction is reliably negative. This is consistent with our hypothesis because it indicates that firms that are performing more poorly in the sense of having smaller revenues pay their CEOs more per dollar of new VC financing the firm raises.

<< Table 5 about here >>

A similar result is observed in model 5.2, where the interaction is between *VC Financing Raised in Last Round* and *Employees*. In models 5.3 and 5.4 we include interactions with our measure of the quality of fundraising, *Experience of Lead VC*, and *Revenues* and *Employees*. Both models point to an interaction coefficient that has the predicted negative sign, but is either insignificant (model 5.3) or only weakly significant (model 5.4).

Overall, these results show that CEO cash pay has a stronger link to fundraising success, especially the quantity of funds, when it is more difficult and important for the CEO to raise

²⁰ In untabulated tests, we replaced *Employees* and *Revenues* with dummy variables that capture each survey interval. We also estimated separate elasticities on *Employees*, *Revenues*, and *Profitability* for each of the three major industry groups (High-Tech, Life Science and Other). We further included *Time between Survey and Last Round* as a control variable (the estimated coefficient on which was insignificant). The estimated coefficients on fundraising success remain statistically significant in all these specifications.

external capital.²¹ This finding supports H2 and adds evidence consistent with the theoretical argument that cash compensation is linked to fundraising because raising capital requires considerable CEO ability and personally costly effort in private venture-backed firms.

6.5 *Tests of alternative explanations for our main findings*

In this section we report the results of ruling out two alternative explanations for our main findings. The first is that CEO compensation in venture-backed compensation does not reflect optimal contracting but instead self-dealing by powerful CEOs. The second explanation, which presents a serious challenge to the interpretation of our results, is that the observed correlation between CEO compensation and fundraising success is endogenously determined by unobserved company or CEO characteristics.

6.5.1 *CEO power*

The idea we advanced in section 3 that CEOs will be paid for successful financing relies on the assumption that the responsibility for, and personal costs borne in, fundraising in private venture-backed firms falls on the CEO. However, it might be that the positive relation we have documented between CEO cash pay and financing success merely arises because CEOs have power in venture-backed firms and therefore pay themselves more even if someone else (such as the CFO or the current VC investors) raises the money. We test this by noting that the CEO power explanation predicts that when the CEO is powerful there will be a positive relation between his/her pay and financing success, but when the CEO is not powerful there will be no such relation. In contrast, the pay-for-financing-performance hypothesis predicts there will be a positive relation between CEO pay and financing success even if the CEO has no power.

We test these competing predictions using the fraction of the firm's equity held by VCs and by the CEO, defining powerful VCs as those that own more than 50% of firm equity, and powerful CEOs as those that own more than 6% of firm equity.²² Table 6 reports the results of estimating the CEO pay-for-financing success relation across the four subsets of observations categorized by powerful vs. non-powerful VCs and powerful vs. non-powerful CEOs.

²¹ In Table 6, we do not distinguish between whether the fresh capital was raised from the firm's current investors or from new VCs. In untabulated regressions, we find no evidence that CEOs who raise more capital from a new lead investor (as opposed to an investor that had already invested in the company) receive higher cash compensation.

²² The 6% figure is somewhat arbitrary. However, our inferences are not sensitive to substantially increasing or decreasing this number.

<< Table 6 about here >>

The key result in model 6.2 shows that even when CEOs hold very little power—because VCs own the majority of the firm’s equity and the CEO personally owns less than 6%—the elasticity of CEO pay with respect to the quantity of VC financing successfully raised in the last round is significantly positive. It is also not significantly different from the elasticity estimated in model 6.3, where the CEO holds a lot of power (because VCs own a minority of the firm’s equity and the CEO personally owns more than 6%). We interpret these results as rejecting the CEO power explanation for the empirically observed pay-for-financing performance relation.

6.5.2 Unobserved factors that influence both CEO compensation and fundraising success

The estimated coefficients on our different proxies for the CEO’s success in raising venture financing could be biased if both fundraising and compensation are endogenously determined by unobserved factors such as company or CEO characteristics. All our regressions therefore include a rich set of control variables (company industry, location, revenues, number of employees, and the profitability dummy) to try to capture the important characteristics of a venture-backed company. We note, however, that it is still possible that there are other unobserved factors that bias our results. An ideal solution would be to estimate a two-stage regression in which we instrument the variables that capture fundraising success. This approach is unfortunately not feasible in our situation because it is very hard to identify a variable that correlates with fundraising but not with CEO compensation. For example, an instrument based on time-varying market conditions would likely fail because CEO compensation will almost certainly be affected by market conditions.

We therefore seek to address the issue of endogeneity through two different types of empirical tests. The first builds on the proposition that unobserved factors should have a symmetric impact on CEO pay relative to the pay of other executives in the same firm. Our second set of tests builds on the proposition that many company and CEO characteristics of a venture-backed firm will be relatively stable over time.

6.5.3 Cross-sectional difference between CEO pay and employees’ pay

If the observed elasticity between CEO pay and fundraising success is biased because unobserved factors affect the compensation to all of the firm’s executives in a similar way, then

the elasticity on CEO pay should disappear if we control for such factors. We test this possibility by calculating the difference between *Total Cash Compensation* for the CEO and the average *Total Cash Compensation* for different levels of executives of the same firm as reported in the same survey. Table 7 then presents the results of regressions in which this difference, calculated across different levels of executives, is regressed on company characteristics, operating performance and, most importantly, fundraising success. The basic idea of these tests is that the CEO puts in more effort in raising venture financing than other executives, and his compensation should accordingly be more tied to fundraising success.

<< Table 7 about here >>

Model 7.1 demonstrates that companies with higher *VC Financing Raised in Last Round* and *VC Financing Except Last Round* exhibit a significantly wider cash compensation difference between the CEO and other non-financial chiefs such as the COO and CIO. To better interpret magnitudes, we use the percentage difference in compensation, $TCC_{CEO} / TCC_{Chiefs} - 1$, as the dependent variable model in 7.2 and include TCC_{Chiefs} as an independent variable to control for average differences. We find that a doubling of the amount raised in the last financing round increases the pay gap between the CEO and other Chiefs by 5.1%. Qualitatively similar results are found in models 7.3 and 7.4, and in models 7.5 and 7.6 for VPs and Directors.

We interpret the consistently positive and significant elasticities on *VC Financing Raised in Last Round* in models 7.1-7.6 as supportive of our prediction that the link between cash compensation and successful fundraising stems from the CEO's effort and skills in raising external financing in opaque and illiquid capital markets.

6.5.4 *Time-series differences in CEO pay*

The cross-sectional results reported in Tables 4 - 7 show that there is a link between cash compensation and fundraising success, even after controlling for a large set of observable company differences in operating performance, growth, and valuation. We can eliminate the impact of any unobserved factors that vary between companies but are constant over time by analyzing time-series changes in compensation for a given company. Examples of such factors include the human capital of the CEO (in cases where the CEO is not replaced), and the nature of the company's business model and market position. At the cost of a substantially reduced sample size, the time-series analysis also allows us to more powerfully assess whether CEO cash pay

increases directly after successful fundraising, or instead increases only gradually and indirectly as the company uses the new money it has raised to expand its operations.

We restrict our sample to the 738 observations for which we have two surveys that are exactly one year apart. We calculate the one-year percentage change in *Total Cash Compensation*, $(TCC_t / TCC_{t-1} - 1)$, and regress it on one-year changes in key independent variables. Results are presented in Table 8. To control for changes in operating performance, we include the one-year changes in *Revenues*, *Employees*, and *Profitability*. To control for level effects, we include the current *Round Number*, *Revenues*, and *Employees* and the CEO's lagged cash compensation (TCC_{t-1}).

<< Table 8 about here >>

In model 8.1, we find that cash compensation increases more for companies that successfully raise any venture capital in the last year, as by the dummy *Dummy Raised Capital*. The estimated coefficient is 4.0%, meaning that fundraising increases the CEO's cash compensation by about \$12,000. We refine the analysis by exploring whether CEO pay increases more if the company raises a larger quantity of venture funding, or if the pay increase is independent of the size of the last financing round. When in model 8.2 we condition the sample on companies that raise capital in the last year, we find that the increase in CEO cash compensation is higher for companies that raise larger amounts, as measured by *VC Financing Raised in Last Round*. The estimated elasticity is 6.2%, which is quantitatively similar to the coefficient that was estimated in the cross-sectional regressions.

Next, we estimate model 8.2 for the subsample of firms that did not secure a new financing round between surveys. Model 8.3 includes firms that raised capital one year before the survey, and model 8.4 those that raised money two years before the survey. We find that the coefficient on *VC Financing Raised in Last Round* is not significant in either model, which indicates that the effect of fundraising on pay is contemporaneous. No models show a significant link between CEO cash pay and one-year changes in revenues, employees or profitability.

Taken together, the time-series evidence reported in Table 8 adds further weight to our conclusion that the link between cash pay and *VC Financing Raised in Last Round* reflects a direct relationship, rather than the effects of unobserved changes in company size and/or operating performance. Our finding that CEO pay does not respond to increases in revenues or

employees is further evidence that fundraising, versus operating performance measures, plays an important role in determining compensation in private venture-backed companies.

6.6 *Robustness tests*

In this section we summarize the results of several concerns we sought to address and additional analyses that we undertook to assess the robustness of our findings.

6.6.1 *Multicollinearity*

We examined whether our estimated regression coefficients are likely to be unduly influenced by multicollinearity. We did not find evidence consistent with this concern. For example, we found that the average variance inflation factor (VIF) of the independent variables in Table 4 is 2, and no individual VIF was above 5. Since a commonly used rule of thumb is that only a VIF value above 10 creates a material multicollinearity problem, we conclude that the correlation structure of the variables we use is unlikely to be problematic in Table 4. Similar conclusions can be drawn for Tables 5-8.

6.6.2 *Founders vs. non-founders*

We investigated whether our results pertain to both founder and non-founder CEOs. Since founder CEOs will have been intimately involved with the firm since its inception, they may identify closely with and gain significant non-financial rewards from their ventures (Wasserman, 2006). Founder CEOs also likely represent a different type of agency problem to VCs than do non-founder CEOs (Palia and Ravid, 2002). We therefore estimated regressions of the type shown in Table 4 that also include an intercept dummy for CEO founder/non-founder status, and interact CEO founder/non-founder status with fundraising success and operating performance. As in Wasserman (2006), untabulated results confirm that founder-CEOs on average earn significantly lower total cash pay than non-founders (approximately \$44,000, based on the estimated coefficients on the founder CEO dummy). Although the elasticities of cash pay with respect to success in the quantity and quality of VC fundraising raised were not significantly higher for founder CEOs, the elasticities for non-founder CEOs remained significantly positive. However, the elasticity of cash pay with respect to operating success as measured by *Revenues* and *Employees* was higher for founder CEOs than for non-founder CEOs.

6.6.3 *Base salary vs. cash bonus*

We also explored whether the link between fundraising and compensation is likely to come from ex-ante contracting or is the outcome of ex-post bargaining between the CEO and the board. Since we do not observe the actual compensation contracts, our analysis was confined to comparing the elasticity on the CEO's salary or bonus, respectively, with the idea that bonuses are tied to ex-ante performance contingencies outlined in the CEO's compensation contract, while base salary is more driven by ex-post rewards or changes in CEO bargaining power. Untabulated regressions using the *Base Salary* and *Bonus* components of *CEO Total Cash Compensation* showed that most performance elasticities were markedly higher for *Bonus* pay than they were for *Base Salary* compensation. Most of the generally larger performance elasticities of *Bonus* stemmed from the decision to grant a bonus, rather than from the size of the bonus per se. These results lead us to conclude that whereas the increase of cash pay due to improvements in operating performance could potentially be attributable to ex-ante contracting between a CEO and the board of directors, the increase due to fundraising success is more likely to reflect an ex-post reward or change in the CEO's bargaining power.

7. **Empirical results on CEO equity ownership**

Our final set of empirical analyses examines CEO equity ownership, bearing in mind that we do not have data on the yearly allocation of options and stock to the CEO in a given year and are therefore limited to studying the CEO ownership of the outstanding (fully diluted and fully converted) equity, and the dollar value of this equity ownership. Table 9 presents our results.

<< Table 9 about here >>

In models 9.1-9.3 we assess how *% Equity Ownership of CEO* varies with fundraising success. Specifically, we estimate Tobit regressions that include controls for operating performance and year, state, and industry dummies. Models 9.1 and 9.2 indicate that *% Equity Ownership of CEO* is decreasing in both *VC Financing Last Round* and *VC Financing Except Last Round*. A doubling of the fundraising amount in the last round is associated with 0.8% lower CEO equity ownership. This relationship holds when in model 9.3 we control for operating performance measures such as maturity, revenues, employees, and profitability. We note that CEO ownership is not related to round number, employees, or revenues, but it is higher

for companies that are profitable. This could indicate that equity incentives may not be continuously adjusted to reflect the firm's performance and maturity.

In model 9.3, we also include available proxies for CEO characteristics and find that founder CEOs have 2.6% higher equity ownership than do non-founder CEOs. Taken together with our finding that founder CEOs earn lower cash pay, this difference may be an indication that founder CEOs are willing to trade off lower cash compensation for higher equity ownership. We also establish that CEOs who are also Chairman of the Board have higher equity ownership.

Dilution of the CEO's percentage ownership is not the same as dilution in the dollar value of the CEO's equity ownership. If the equity issued in a new financing round is sold at a higher price than in the previous round, then the dollar value of the CEO's ownership increases. Thus, the economically more substantive measure of equity compensation is the interaction between valuation and ownership fraction, that is, the variable *Implied Value of CEO Equity*. In models 9.4-9.6 we restrict the sample to the subset of observations for which firm-valuation data are available, and we then re-estimate OLS regressions using *Implied Value of CEO Equity* as the dependent variable.²³

The results of estimating models 9.4-9.6 show that *Implied Value of CEO Equity* is determined in a way that is qualitatively similar to *CEO Total Cash Compensation*; that is, it is increasing in both fundraising success and operating performance. The estimated coefficients on *VC Financing Raised in Last Round* and *VC Financing Except Last Round* in model 9.4 are positive, significant, and large. A doubling of the financing amount in the last VC round is associated with a 64% increase in the dollar value of CEO equity ownership (model 9.4). This coefficient remains large and significant after controlling for company operating performance in model 9.5 and CEO characteristics in model 9.6. Moreover, the *Implied Value of CEO Equity* is far higher for firms that have raised more rounds of financing and have more employees.

Taken together, our results with regard to CEO equity ownership suggest that even though successful fundraising dilutes the CEO's percentage ownership, the dollar value of his ownership increases markedly with successful VC fundraising. As such, the increase in cash

²³ We acknowledge that the subsample for which the firm's post-money value at the last VC financing round is available is likely to be biased toward companies with higher valuations, since failed companies and their VC investors are less willing to report valuations. In unreported regressions we test whether the observations with valuation data differ from other observations. We find that companies with higher *Revenues*, fewer *Employees*, and larger *VC Financing Raised in Last Round* are more likely to report valuation data. While this selection bias affects the unconditional values of the CEO's cash and equity compensation, it is unlikely to affect the inferences we draw from our estimated regression coefficients, as they measure differences within the sample.

compensation following successful fundraising is unlikely to be a response to the dilution of the CEO's equity ownership. Moreover, the coefficients on equity ownership value are considerably higher than those on cash pay. Thus, not only does the equity compensation have a higher average dollar value to the CEO than the cash compensation, but the sensitivity to fundraising success and improved operating performance is larger. From this we conclude that CEOs in venture-backed companies are likely to be primarily motivated by increasing the value of their equity compensation. However, after correctly adjusting for the cash flow effects of VC preferred stock, we have shown that cash compensation is a non-trivial part of the CEO's total compensation package.

8. Summary and suggestions for future study

Our goal in this paper has been to study how CEOs in private start-ups are compensated. If both cash pay and equity are used to align the incentives of CEOs and equity investors, then viewed from a Holmström (1979) principal-agent perspective, each type of compensation should be higher for CEOs who successfully take actions that enhance shareholder value. From this starting point, we conceptually proposed and empirically tested two hypotheses that build on the idea that in young venture-backed firms, successful *financing* actions will be rewarded. The economic motivation behind this hypothesis is the observation that the typical venture-backed start-up demands considerable external financing to survive and flourish, but the supply of that financing comes through an illiquid and informationally opaque capital market. Without multiple injections of new capital, a firm of the type backed by venture capital is likely to go bankrupt rather than realize its goal of going public or being acquired. Thus, fundraising for private venture-backed companies is a difficult and personally costly CEO task.

Using a novel VentureOne compensation database on 1,585 U.S. venture-backed firms, we showed that CEO cash pay is indeed higher in firms that have recently raised more equity and that have attracted more experienced VCs. We argued that the observed elasticity on fundraising is unlikely to be due to differences in firm size because it is robust to controls for firm characteristics, operating performance, and valuation. Consistent with the theoretically motivated expectation that fundraising increases pay as a response to CEO effort and abilities, we find that the link between CEO cash pay and fundraising success is also larger when fundraising is more difficult, and it is larger for the CEO than for executives who are not

involved in fundraising. Our analysis of time-series changes in compensation shows that fundraising yields a direct and contemporaneous increase in CEO cash pay. Finally, our results for equity pay show that while successful fundraising dilutes the CEO's ownership stake, it increases the dollar value of that ownership.

While our paper adds to the compensation and entrepreneurial finance literatures, it leaves many questions unanswered. For example, how and why does entrepreneur-CEO pay change with the intensity of VC ownership and other governance mechanisms used by VCs? How and why might CEO pay be related to hiring and firing decisions differently for young venture-backed firms than for mature publicly traded companies? To what degree and why are non-CEO employees compensated with equity and cash? Are CEOs adequately compensated for the risk that their companies will fail? We believe these are topics worthy of future study.

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Figure 1

Distribution of Total Cash Compensation (in \$000s) for 2,816 CEOs of private venture-backed U.S. firms, 2002-2006

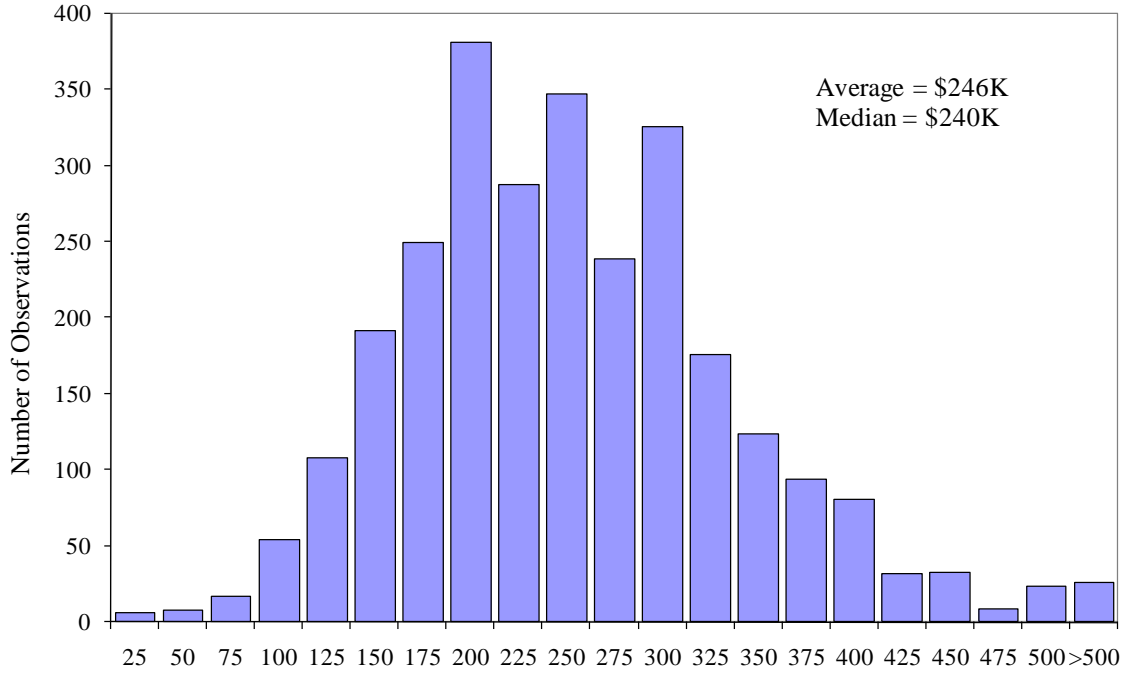


Figure 2

Distribution of Percentage of Fully Diluted Equity Ownership Held by 2,816 CEOs of private venture-backed U.S. firms, 2002-2006

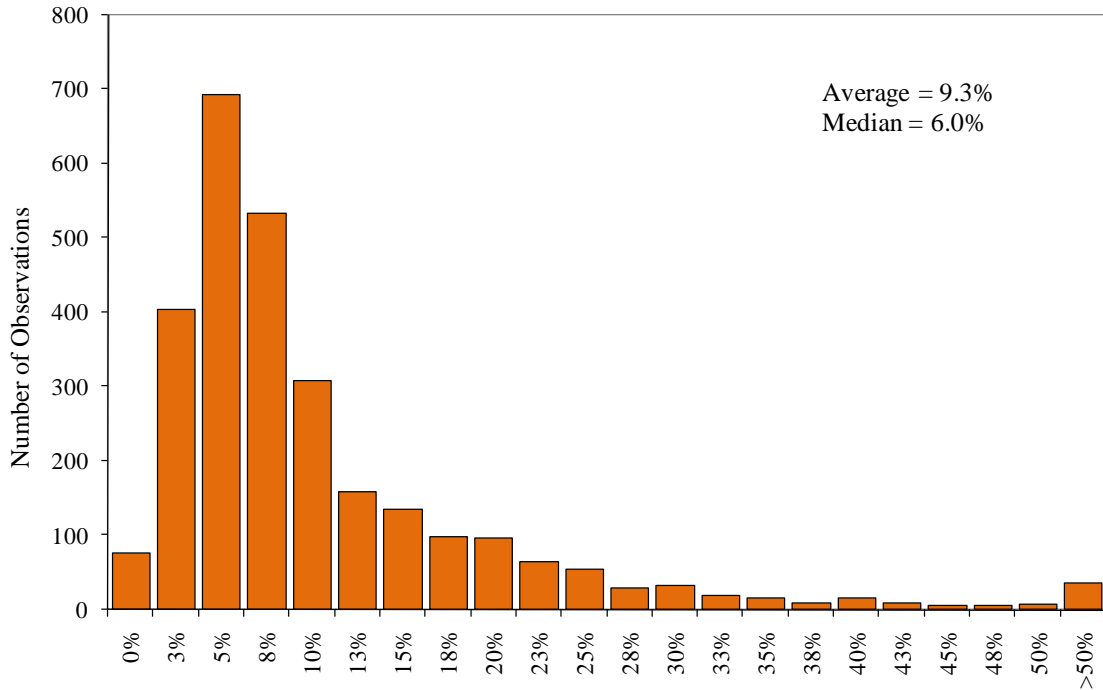


Table 1**CEO Sample Overview**

Sample comes from surveys of venture-backed U.S. companies conducted by VentureOne from 2002-2006. Each survey asks the company to provide data on company performance and employee compensation. We limit our analysis to CEOs/presidents and keep only one survey per firm per year (starting from 2003, VentureOne sent out 2 surveys per year). We match our sample with data on company characteristics, VC ownership, and financing from VentureOne's financing and general support databases. Finally, we remove any observation with missing or obviously incorrect information. The final sample is a panel dataset with each observation being one individual/year pair. Panel A shows the steps of the sample filtering. Panel B tabulates the final sample by survey. Panel C tabulates the final sample by the number of surveys per company. Total number of unique company/years are 2,471 because some companies list both President and CEO, and some list multiple CEOs.

Panel A - Sample Selection

	<u>Observations</u>	<u>Companies</u>
VentureOne Survey Data	61,005	2,975
Keep CEOs / Presidents only	6,420	2,913
Keep one Survey per Year	4,921	2,913
Match with Company Characteristics	4,084	2,199
Match with VC ownership	3,160	1,754
Match with Round Financing data	2,983	1,656
Final sample	2,816	1,585
Subsample with Valuation data	1,247	755
Subsample with Time-Series data	736	544

Panel B - Tabulation by Number of Observations by Company/Year

<u>Observations by Company/Year</u>	<u>N</u>
1	960
2	820
3	540
4	116
5	35
Unique Company/Years	2,471

Panel C - Tabulation by Survey

<u>Year</u>	<u>Spring Survey</u>	<u>Fall Survey</u>	<u>Total</u>
2002	431	0	431
2003	327	0	327
2004	615	340	955
2005	392	197	589
2006	514	0	514
Total	2,279	537	2,816

Table 2
Descriptive Statistics

See Table 1 for description of sample. One observation is one individual/year pair, and total sample size is 2,816. Variables related to Company Operating Performance, CEO Characteristics and CEO Compensation come from VentureOne surveys. Total Compensation is the sum of Base Salary, Bonus, and Other Compensation. Employees in Previous Year is the median number of actual Employees for the range reported in the survey, and Revenues in Previous Year is the average value of the range reported in the survey. Dummy Profitable is reported in survey (but not actual profit number). Variables related to Company Financing Performance and Characteristics of Lead VC come from VentureOne's financing and general support databases, and refer to the situation of the company prior to filling out the survey. % Equity Ownership by VCs is calculated by dividing the number of preferred shares by the total number of common + preferred shares outstanding.

Panel A	Mean	Std. Dev.	Min.	Max.
<u>Company Financing Performance</u>				
Year of company's first financing round	2000	3	1984	2005
Round number of last round	3.23	1.25	1	7
VC financing previous rounds except last (\$000s)	\$12,422	\$21,970	\$0	\$320,280
VC financing last round (\$000s)	\$11,707	\$14,294	\$75	\$350,000
Experience of lead VC (number of portfolio companies)	66	93	0	539
Time between survey and last round (months)	21	19	0	171
<u>Company Operating Performance</u>				
Employees at end of previous year	39	37	6	131
Revenues in previous year (\$000s)	\$8,021	\$17,045	\$250	\$65,000
Dummy Employees higher in current year (1=yes, 0=no)	0.50	0.50	0	1
Dummy Revenues higher in current year (1=yes, 0=no)	0.57	0.49	0	1
Dummy Profitable (1=yes, 0=no)	0.06	0.24	0	1
Company start year	1998	3	1980	2005
Company age (years)	3.69	3.08	0	23
Pre-money valuation of last round (\$000s)	\$34,392	\$61,969	\$100	\$1,032,950
Matched NASDAQ Asset Market-Book	2.81	0.56	1.72	3.66
Panel B				
<u>CEO Compensation</u>				
Total cash compensation (\$000s)	\$246	\$90	\$12	\$800
Base salary (\$000s)	\$209	\$61	\$12	\$500
Bonus (\$000s)	\$35	\$49	\$0	\$600
Other compensation (\$000s)	\$2	\$13	\$0	\$250
Dummy Bonus (1=yes, 0=no)	0.51	0.50	0	1
Time series (one year) difference in Total cash comp (\$000s)	\$12	\$53	-\$320	\$510
Time series (one year) increase in Total cash comp (%)	8%	27%	-47%	367%
Difference in Total cash comp. between CEO and Chiefs	\$75	\$69	-\$163	\$598
Difference in Total cash comp. between CEO and VPs	\$80	\$74	-\$203	\$601
Difference in Total cash comp. between CEO and Directors	\$134	\$82	-\$126	\$675
% Equity ownership of CEO	9%	10%	0%	83%
Implied value of CEO's % equity ownership (\$000s)	\$4,632	\$12,460	\$0	\$260,000
<u>CEO Characteristics</u>				
Dummy Founder (1=yes, 0=no)	0.43	0.50	0	1
Dummy Hired in prior 6 months (1=yes, 0=no)	0.05	0.22	0	1
Dummy Chairman of board (1=yes, 0=no)	0.05	0.21	0	1

Table 3

CEO Compensation, Ownership and Ownership Value by Firm Characteristics

See Table 1 for description of sample. Each observation is one individual/year pair, and total sample size is 2,816. All compensation variables come from VentureOne surveys and are reported in \$000s. Total Cash Compensation is the sum of Base Salary, Bonus, and Other Compensation. Reported statistics are sample means, with medians in parentheses. % Equity is calculated on a fully diluted basis. Implied value of % Equity is the product of % Equity and Post-money valuation of last round (variable only available for subset of sample).

<u>Round Number</u>	# obs.	Total Cash Compensation	Base Salary	Bonus	% Equity	Implied Value of % Equity
1	66	189 (186)	164 (175)	26 (0)	10% (7%)	405 (185)
2	852	221 (205)	194 (190)	25 (0)	11% (7%)	2,258 (1,166)
3	903	243 (240)	206 (200)	35 (10)	9% (6%)	4,016 (1,559)
4	582	269 (260)	225 (225)	42 (25)	8% (5%)	7,427 (2,727)
5	256	281 (275)	232 (225)	47 (23)	8% (5%)	8,401 (3,192)
6	103	287 (287)	242 (230)	44 (20)	7% (4%)	8,451 (3,417)
7	54	280 (277)	224 (223)	50 (38)	9% (5%)	5,022 (1,678)
<u>Revenues (\$)</u>						
0 - 0.5M	1,066	232 (225)	208 (200)	22 (0)	10% (6%)	3,369 (1,568)
0.5M - 1M	217	224 (210)	195 (200)	27 (0)	10% (6%)	2,614 (1,471)
1M - 2M	302	222 (205)	191 (200)	29 (0)	10% (6%)	5,224 (1,368)
2M - 3M	184	247 (238)	201 (200)	44 (30)	8% (6%)	3,003 (1,350)
3M - 5M	261	240 (235)	197 (200)	41 (25)	8% (5%)	4,855 (1,730)
5M - 10M	332	266 (250)	220 (220)	43 (25)	10% (7%)	7,073 (2,666)
10M - 20M	236	284 (290)	227 (224)	54 (48)	8% (4%)	6,121 (1,864)
>20M	218	307 (290)	243 (239)	63 (50)	9% (5%)	8,383 (2,751)
<u>Employees</u>						
0 - 10	385	202 (200)	183 (180)	17 (0)	10% (7%)	1,321 (769)
10 - 20	518	215 (200)	190 (190)	24 (0)	11% (7%)	2,650 (1,131)
20 - 30	465	239 (230)	204 (200)	32 (0)	9% (6%)	3,113 (1,822)
30 - 40	324	250 (240)	212 (200)	36 (20)	9% (6%)	3,481 (1,937)
40 - 50	261	259 (250)	222 (215)	35 (18)	8% (5%)	4,459 (2,140)
50 - 60	210	269 (268)	224 (225)	43 (30)	8% (5%)	10,378 (3,194)
60 - 100	324	280 (280)	231 (225)	48 (30)	9% (5%)	6,895 (2,726)
>100	329	295 (285)	237 (225)	56 (50)	9% (5%)	9,070 (3,114)
<u>Last Financing Amount (\$)</u>						
0 - 3M	626	210 (193)	178 (175)	30 (0)	11% (7%)	1,253 (566)
3M - 6M	585	236 (225)	196 (200)	38 (25)	10% (7%)	3,653 (1,117)
6M - 10M	500	240 (230)	207 (200)	32 (0)	9% (6%)	2,573 (1,350)
10M - 17M	546	259 (250)	223 (225)	35 (6)	8% (5%)	4,008 (2,098)
>17M	559	290 (280)	248 (247)	39 (10)	8% (5%)	9,865 (4,232)
<u>Year</u>						
2002	431	239 (225)	201 (200)	36 (0)	13% (11%)	6,050 (3,066)
2003	327	253 (240)	210 (200)	40 (10)	16% (13%)	10,271 (3,499)
2004	955	238 (230)	207 (200)	29 (0)	7% (5%)	3,290 (1,232)
2005	589	246 (240)	210 (200)	34 (18)	8% (5%)	2,641 (1,274)
2006	514	261 (250)	219 (220)	40 (25)	7% (5%)	2,526 (1,177)
<u>Industry</u>						
Healthcare/Biotechnology	806	264 (260)	232 (234)	30 (10)	9% (5%)	3,656 (1,827)
Information Technology	1,475	237 (225)	199 (200)	35 (0)	10% (6%)	5,569 (1,801)
Retail/Services + Other	535	245 (225)	203 (200)	40 (19)	9% (6%)	4,235 (1,239)

Table 4

CEO Total Cash Compensation regressed on Fundraising Success, Operating Performance and CEO Characteristics

*See Table 1 for description of sample. Each observation is one individual/year pair. Dependent variable is log (1 + CEO Total Cash Compensation), defined as the sum of Base Salary, Bonus, and Other Compensation, in \$000s. Sample restricted to observations where CEO can be identified by name in specification 4.5. Standard errors are clustered by company. T-stats are in square brackets. Two-tailed test significance are marked with * for 10%, ** for 5% and *** for 1%. Constant is estimated but not reported.*

Panel A: Pearson correlations among independent variables

	1	2	3	4	5	6	7	8	9	10	11	12
1 Round number of most recent VC financing (1 to 7)												
2 ln (1 + VC financing raised in last round in \$000s)	0.18											
3 ln (1 + VC financing except last round in \$000s)	0.64	0.24										
4 ln (1 + Experience of lead VC (# companies))	0.11	0.16	0.13									
5 ln (1 + Revenues in previous year in \$000s)	0.35	0.06	0.26	-0.03								
6 ln (1 + #Employees at end of previous year)	0.42	0.36	0.39	0.07	0.69							
7 Dummy Profitable (1=yes, 0=no)	0.08	-0.15	0.04	-0.05	0.29	0.16						
8 Dummy Revenues higher in current year (1=yes, 0=no)	-0.08	-0.06	-0.05	-0.07	-0.11	-0.02	-0.07					
9 Dummy Employees higher in current year (1=yes, 0=no)	-0.20	-0.05	-0.15	0.01	-0.26	-0.32	-0.08	0.29				
10 Dummy Hired in Prior 6 months (1=yes, 0=no)	-0.04	-0.02	-0.06	-0.01	-0.04	-0.08	0.01	0.03	0.07			
11 Dummy Chairman of Board (1=yes, 0=no)	0.03	0.02	0.04	0.01	0.04	0.07	0.03	0.04	-0.02	0.00		
12 Dummy Founder (1=yes, 0=no)	-0.19	-0.08	-0.18	0.00	-0.04	-0.06	0.02	0.01	0.04	-0.17	-0.09	
13 Matched NASDAQ Asset Market-Book	-0.01	0.10	-0.03	0.05	-0.22	-0.17	-0.09	-0.13	0.04	-0.01	0.01	-0.03

Table 4 (continued)

Panel B: Regression results

Dependent variable:	ln (1 + CEO Total Cash Compensation)						
	Model:	4.1	4.2	4.3	4.4	4.5	4.6
Round number of most recent VC financing (1 to 7)	0.076 [10.4]***		0.036 [4.1]***	0.004 [0.4]	0.005 [0.5]	0.021 [1.1]	
ln (1 + VC financing raised in last round in \$000s)		0.099 [10.0]***	0.094 [9.3]***	0.069 [6.8]***	0.078 [8.0]***	0.063 [3.6]***	
ln (1 + VC financing except last round in \$000s)		0.016 [8.5]***	0.010 [3.9]***	0.006 [2.5]**	0.006 [2.4]**	-0.004 [-0.8]	
ln (1 + Experience of lead VC (# companies))			0.015 [2.6]***	0.015 [2.8]***	0.014 [2.5]**	0.035 [2.9]***	
ln (1 + Revenues in previous year in \$000s)				0.019 [2.8]***	0.018 [2.8]***	0.028 [1.7]*	
ln (1 + #Employees at end of previous year)				0.083 [5.7]***	0.061 [4.4]***	0.073 [2.8]***	
Dummy Profitable (1=yes, 0=no)				0.055 [1.5]	0.071 [2.0]*	0.038 [0.6]	
Dummy Revenues higher in current year (1=yes, 0=no)				-0.024 [-1.5]			
Dummy Employees higher in current year (1=yes, 0=no)				0.055 [3.4]***			
Dummy Hired in Prior 6 months (1=yes, 0=no)				0.024 [0.8]	0.019 [0.6]	-0.186 [-2.3]**	
Dummy Chairman of Board (1=yes, 0=no)				0.052 [1.0]	0.050 [1.0]	-0.297 [-1.1]	
Dummy Founder (1=yes, 0=no)				-0.181 [-11.0]***	-0.181 [-10.9]***	-0.195 [-5.5]***	
Matched NASDAQ Asset Market-Book					0.070 [3.6]***		
Dummy CEO has Prior CEO Experience in VC-Backed Firm (1=yes, 0=no)						0.017 [0.2]	
# obs.	2,816	2,816	2,816	2,816	2,816	511	
Adj. R-squared	0.16	0.23	0.24	0.33	0.30	0.40	
Sample	Full	Full	Full	Full	Full	Valid Data	
Year, State and Industry controls	Yes	Yes	Yes	Yes	Year+State	Yes	

Table 5

CEO Total Cash Compensation regressed on Fundraising Success, CEO Characteristics, Operating Performance, and Operating/Financing Interactions

*See Table 1 for description of sample. Each observation is one individual/year pair. Dependent variable is log (1 + CEO Total Cash Compensation), defined as the sum of Base Salary, Bonus, and Other Compensation, in \$000s. Standard errors are clustered by company. T-stats are in square brackets. Two-tailed test significance are marked with * for 10%, ** for 5% and *** for 1%. Constant is estimated but not reported.*

	Dependent variable: ln (1 + CEO Total Cash Compensation)			
	Model: 5.1	5.2	5.3	5.4
Round number of most recent VC financing (1 to 7)	0.004 [0.4]	0.003 [0.3]	0.004 [0.4]	0.004 [0.4]
ln (1 + VC financing raised in last round in \$000s)	0.178 [4.9]***	0.156 [5.1]***	0.072 [7.2]***	0.073 [7.2]***
ln (1 + VC financing except last round in \$000s)	0.005 [2.0]**	0.005 [2.3]**	0.005 [2.2]**	0.005 [2.3]**
ln (1 + Experience of lead VC (# companies))	0.017 [3.3]***	0.017 [3.3]***	0.048 [2.2]**	0.050 [2.7]***
ln (1 + #Employees at end of previous year)	0.153 [3.3]***	0.023 [3.4]***	0.034 [2.9]***	0.021 [3.2]***
ln (1 + Revenues in previous year in \$000s)	0.062 [4.4]***	0.297 [3.8]***	0.070 [5.1]***	0.100 [4.5]***
Dummy Profitable (1=yes, 0=no)	0.044 [1.3]	0.051 [1.4]	0.062 [1.7]*	0.062 [1.7]*
Dummy Hired in Last 6 months (1=yes, 0=no)	0.027 [0.9]	0.028 [0.9]	0.028 [1.0]	0.027 [0.9]
Chairman of board (1=yes, 0=no)	0.057 [1.2]	0.052 [1.0]	0.050 [1.0]	0.049 [1.0]
Dummy Founder (1=yes, 0=no)	-0.179 [-10.8]***	-0.177 [-10.7]***	-0.179 [-10.9]***	-0.180 [-10.9]***
ln (1 + VC financing raised in last round in \$000s) X ln (1 + revenues in previous year in \$000s)	-0.014 [-3.0]***			
ln (1 + VC financing raised in last round in \$000s) X ln (1 + #employees at end of previous year)		-0.026 [3.0]***		
ln (1 + Experience of lead VC (# companies)) X ln (1 + revenues in previous year in \$000s)			-0.004 [-1.5]	
ln (1 + Experience of lead VC (# companies)) X ln (1 + #employees at end of previous year)				-0.010 [-1.8]*
# obs.	2,816	2,816	2,816	2,816
Adj. R-squared	0.33	0.33	0.33	0.33
Year, State and Industry controls	Yes	Yes	Yes	Yes

Table 6

CEO Total Cash Compensation Regressed on Fundraising Success for Subsamples formed on VC and CEO Equity Ownership

See Table 1 for description of sample. Each observation is one individual/year pair. Dependent variable is log (1 + CEO Total Cash Compensation), defined as the sum of Base Salary, Bonus, and Other Compensation, in \$000s. Models 7.1-7.4 splits the sample of VC and CEO % equity ownership. Standard errors are clustered by company. T-stats are in square brackets. Two-tailed test significance are marked with * for 10%, ** for 5% and *** for 1%. Constant is estimated but not reported.

	Dependent variable: ln (1 + CEO Total Cash Compensation)			
	VC > 50% CEO > 6%	VC > 50% CEO < 6%	VC < 50% CEO > 6%	VC < 50% CEO < 6%
	Model: 6.1	6.2	6.3	6.4
VC equity ownership				
CEO equity ownership				
Round number of most recent VC financing (1 to 7)	0.015 [1.3]	0.000 [0.0]	0.004 [0.2]	0.012 [0.4]
ln (1 + VC financing raised in last round in \$000s)	0.074 [4.4]***	0.067 [4.7]***	0.090 [3.6]***	0.099 [4.1]***
ln (1 + VC financing except last round in \$000s)	0.006 [1.5]	0.003 [1.0]	0.005 [0.7]	0.002 [0.3]
ln (1 + Experience of lead VC (# companies))	0.002 [0.4]	0.004 [0.7]	0.009 [0.7]	-0.007 [-0.4]
ln (1 + Revenues in previous year in \$000s)	0.015 [1.5]	0.030 [2.9]***	-0.002 [-0.1]	0.071 [2.8]***
ln (1 + #Employees at end of previous year)	0.034 [1.5]	0.078 [4.0]***	0.143 [3.3]***	0.078 [1.5]
Dummy Profitable (1=yes, 0=no)	0.059 [1.3]	0.064 [1.2]	0.170 [1.9]*	0.060 [0.6]
Dummy Hired in Prior 6 months (1=yes, 0=no)	-0.024 [-0.5]	0.027 [0.5]	0.032 [0.3]	0.290 [3.3]***
Dummy Chairman of Board (1=yes, 0=no)	-0.071 [-0.6]	0.073 [1.4]	0.170 [1.5]	0.113 [1.1]
Dummy Founder (1=yes, 0=no)	-0.188 [-7.0]***	-0.219 [-9.8]***	-0.077 [-1.3]	-0.150 [-2.5]**
# obs.	1,108	1,092	289	327
Adj. R-squared	0.30	0.38	0.54	0.50
Year, State and Industry controls	Yes	Yes	Yes	Yes

Table 7

Difference in Total Cash Compensation between CEOs and Other Executives Regressed on Company Fundraising Success, and Operating Performance

See Table 1 for description of sample. Each observation is one company/year pair. Dependent variable is (CEO Total Cash Compensation - Benchmark Executive Total Cash Compensation), where Total Cash Compensation is defined as the sum of Base Salary, Bonus, and Other Compensation, in \$000s, and Benchmark sample is the company/year average of executives within that benchmark group. T-stats are in square brackets. Two-tailed test significance are marked with * for 10%, ** for 5% and *** for 1%. Constant is estimated but not reported.

	Dependent variable: (CEO Total Cash Comp. - Benchmark Total Cash Comp.)					
	\$	%	\$	%	\$	%
Benchmark Sample:	Chiefs		Vice Presidents		Directors	
Model:	7.1	7.2	7.3	7.4	7.5	7.6
Round number of most recent VC financing (1 to 7)	1.37 [0.8]	0.005 [0.5]	2.27 [1.2]	0.009 [0.8]	3.50 [1.6]	0.029 [1.4]
ln (1 + VC financing raised in last round in \$000s)	3.78 [2.0]**	0.051 [2.3]**	6.65 [3.3]***	0.052 [4.3]***	11.30 [4.9]***	0.13 [5.8]***
ln (1 + VC financing except last round in \$000s)	1.25 [2.5]**	0.010 [2.7]***	0.27 [0.6]	0.003 [1.0]	0.48 [0.8]	0.003 [0.6]
ln (1 + Experience of lead VC (# companies))	1.39 [1.1]	0.009 [1.1]	-0.058 [0.1]	0.002 [0.2]	2.83 [2.1]**	0.039 [3.2]***
ln (1 + #Employees at end of previous year)	4.32 [1.4]	0.041 [1.8]*	12.14 [3.7]***	0.078 [4.0]***	12.52 [3.5]***	0.13 [3.6]***
ln (1 + Revenues in previous year in \$000s)	2.91 [2.0]**	0.033 [2.5]**	3.67 [2.5]**	0.024 [2.8]***	6.63 [3.9]***	0.053 [3.3]***
Dummy Profitable (1=yes, 0=no)	7.16 [0.8]	0.087 [1.5]	10.64 [1.3]	0.079 [1.7]*	9.57 [0.9]	0.14 [1.2]
Dummy Founder (1=yes, 0=no)	-35.60 [-9.6]***	-0.26 [-9.3]***	-34.39 [-9.3]***	-0.21 [-9.5]***	-35.78 [-8.4]***	-0.33 [-8.3]***
Chairman of board (1=yes, 0=no)	7.47 [0.8]	0.041 [0.6]	9.20 [0.9]	0.079 [1.3]	5.71 [0.4]	0.020 [0.2]
Dummy Hired in Last 6 months (1=yes, 0=no)	3.97 [0.5]	0.045 [0.9]	8.13 [1.2]	0.071 [1.6]	-4.62 [0.5]	0.058 [0.7]
TCC for non-CEO		-0.95 [-3.9]***		-0.57 [-9.4]***		-1.65 [-14.2]***
# obs.	1,912	1,912	2,163	2,163	1,607	1,607
Adj. R-squared	0.18	0.26	0.22	0.25	0.30	0.41

Table 8

Year-to-Year Percentage Difference in Within-Firm CEO Total Cash Compensation Regressed on Company Fundraising Success, and Operating Performance

See Table 1 for description of sample. Each observation is one company/year pair. Sample is limited to observations that also have a survey in the previous year. Dependent variable is percentage yearly change in CEO Total Cash Compensation (defined as $CEO\ Total\ Cash\ Compensation[T] / CEO\ Total\ Cash\ Compensation[T-1] - 1$), where Total Cash Compensation is defined as the sum of Base Salary, Bonus, and Other Compensation, in \$000s. T-stats are in square brackets. Full sample in specifications I, companies that raised capital during the year in specification II, and companies that did not raise capital in specifications III and IV. Two-tailed test significance are marked with * for 10%, ** for 5% and *** for 1%. Constant is estimated but not

	Dependent variable: (CEO Total Cash Comp TCC[T] / CEO TCC[T-1]) - 1			
Model:	8.1	8.2	8.3	8.4
Round number of most recent VC financing (1 to 7)	0.003 [0.4]	-0.004 [-0.2]	0.034 [1.8]*	0.009 [0.8]
ln (1 + revenues in previous year in \$000s)	0.020 [2.3]**	0.052 [2.5]**	0.010 [0.6]	0.014 [1.0]
ln (1 + #employees at end of previous year)	0.029 [1.7]*	-0.034 [-0.8]	0.020 [0.5]	0.045 [1.6]
Dummy raised capital	0.040 [1.9]*			
ln (1 + VC financing raised in last round in \$000s)		0.062 [2.7]***	0.016 [0.7]	-0.011 [-0.8]
Change in profitability	0.061 [0.6]	0.115 [0.7]	0.000 [<0.1]	0.057 [0.4]
Change in revenues	0.001 [0.1]	-0.023 [-1.2]	-0.012 [-0.7]	0.024 [1.4]
Change in employees	-0.032 [-1.3]	-0.066 [-1.4]	0.011 [0.2]	-0.020 [-0.5]
TCC in previous year	-0.33 [-10.9]***	-0.30 [-4.8]***	-0.41 [-6.7]***	-0.30 [-6.4]***
# obs.	738	225	225	288
Adj. R-squared	0.29	0.35	0.54	0.33
Year, State and Industry controls	Yes	Yes	Yes	Yes
Sample limited to companies that raised capital within period	Any time	Before 12 months	Between 13 -24 months	After 24 months

Table 9

Implied Value of CEO Equity Regressed on Company Fundraising Success and Operating Performance

See Table 1 for description of sample. One observation is one individual/year pair. Dependent variable is the implied value of the fully diluted firm equity held by the CEO, defined as product of the fraction of fully diluted equity held by the CEO (see Table VI) and the firm's post-money valuation at its most recent financing round (where available). Standard errors are clustered by company. T-stats are in square brackets. Two-tailed test significance are marked with * for 10%, ** for 5% and *** for 1%. Constant is estimated but not reported.

Dependent variable:	ln(1 + Implied Value of CEO Equity in \$000s)					
	% Equity ownership of CEO					
Model:	9.1	9.2	9.3	9.4	9.5	9.6
Round number of most recent VC financing (1 to 7)		-0.010 [-2.0]*	-0.010 [-1.2]		0.230 [3.9]***	0.220 [3.6]***
ln (1 + VC financing except last round in \$000s)		-0.010 [-3.6]***	-0.010 [-3.2]***		-0.020 [-1.0]	-0.020 [-1.0]
ln (1 + VC financing raised in last round in \$000s)	-0.011 [-6.6]***	-0.007 [-3.5]***	-0.006 [-3.3]***	0.639 [11.3]***	0.494 [7.0]***	0.502 [6.9]***
ln (1 + Experience of lead VC (# companies))			0.000 [0.3]			-0.037 [-0.9]
ln (1 + #Employees at end of previous year)		-0.002 [0.6]	-0.003 [0.9]		0.281 [2.5]**	0.273 [2.4]**
ln (1 + Revenues in previous year in \$000s)		0.001 [0.6]	0.001 [0.6]		-0.004 [0.1]	-0.009 [-0.2]
Dummy Profitable (1=yes, 0=no)		0.017 [2.2]**	0.016 [2.1]**		-0.059 [-0.2]	-0.028 [-0.1]
Dummy Founder (1=yes, 0=no)			0.026 [6.9]***			-0.125 [-1.0]
Chairman of board (1=yes, 0=no)			0.016 [1.9]*			0.391 [2.0]**
Dummy Hired in Last 6 months (1=yes, 0=no)			-0.011 [-1.4]			-0.166 [-0.9]
# obs.	2,816	2,816	2,816	1,247	1,247	1,247
Adj. R-squared	-0.07	-0.11	-0.12	0.17	0.26	0.26