

A Comparison of CEO Pay in Public and Private US Firms*

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Abstract

We provide a comprehensive comparison of CEO pay in public and private US firms over the period 1999 through 2008. In both public and private firms CEO pay increases at the same rate over time as does firm size, which is roughly consistent with the arguments of Gabaix and Landier (2008). However, we find that, all else equal, public firm CEOs earn a 24% pay premium over private firm CEOs. In addition, public firm pay is positively related to both accounting and stock price performance, while private firm pay is basically unrelated to firm performance. The public firm pay premium combined with the fact that private firm pay does not respond to changes in firm value in the public sector suggests that public and private firms operate in segmented labor markets. The structure of pay in public firms contains significant equity based incentives, while private firms rely more on salary and bonus. Finally, we show that there is a significant change in both the level and structure of pay when firms transition from private to public status.

Keywords: CEO pay; pay-performance sensitivity; pay structure; private firms; public firms

JEL Classification: G34

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Abstract

We provide a comprehensive comparison of CEO pay in private and public US firms over the period 1999 through 2008. Both public and private firm pay increases at the same rate over time as does firm size, which is roughly consistent with the arguments of Gabaix and Landier (2008). However, we find that, all else equal, public firm CEOs earn a 24% pay premium over private firm CEOs. In addition, public firm pay is positively related to both accounting and stock price performance, while private firm pay is basically unrelated to firm performance. The public firm pay premium combined with the fact that private firm pay does not respond to changes in firm value in the public sector suggests that public and private firms operate in segmented labor markets. The structure of pay in public firms contains significant equity based incentives, while private firms rely more on salary and bonus. Finally, we show that there is a significant change in both the level and structure of pay when firms transition from private to public status.

1. Introduction

The level and structure of compensation for top executives plays a number of roles, including the provision of incentives for effort, the retention of human capital, and as a sorting mechanism. An extremely large literature exists that examines the determinants of the level and structure of CEO pay in public US companies (see for example, the seminal work by Jensen and Murphy (1990), the survey by Murphy (1999), and the recent book by Bebchuk and Fried (2003)). In contrast, because of data constraints, there is almost no evidence regarding pay in private companies in the US.¹ In this paper we provide some of the first comparisons of CEO pay in public and private US firms using a new database that provides detailed data on pay in a large sample of private US firms over the period 1999 to 2008. Compared to existing studies, the private companies in our database are much more representative of the sample of public firms in terms of size, industry coverage, and accounting performance. We use this data both to provide new descriptive evidence on CEO pay in private firms and to validate evidence on a number of hypotheses about the determinants of CEO pay that have been documented for public firms.

In terms of descriptive evidence, the growth rates in overall pay levels and in firm size are similar across both public and private firms and the elasticity of pay to firm size is also comparable across the two firm types. The fact that the time trends in pay parallel the trends in firm size in both samples is roughly consistent with the arguments in Gabaix and Landier (2008) where more talented CEOs are matched with larger firms. The results differ from those reported in Cole and Mehran (2008), however, who find that pay in a sample of private

¹Piecemeal evidence on CEO pay in small private firms, early stage firms, private insurance companies is provided by Cavalluzzo and Sankaraguruswamy (2000), Cole and Mehran (2008), Bengtsson and Hand (2010), Ke, Petroni, and Safieddine (1999). Nakazato, Ramseyer, and Rasmusen (2009) provide a comparison of CEO pay in public and private firms using Japanese data.

firms drawn from the small business finance data has fallen over time, and that private firms have significantly higher pay-size elasticity compared to public firms.

Next we compare pay levels between public and private firms, controlling for firm and CEO characteristics. We find robust evidence of a substantial pay premium in public firms. All else equal, CEOs in public firms have total pay (cash pay) that is 24% (9%) higher on average than those in private firms, and this premium has grown substantially over time. We also demonstrate that the structure of pay differs significantly between public and private firms. Perhaps not surprisingly, private firm CEOs receive more of their compensation in the form of salary and bonus and less from options and restricted stock. Nevertheless, the use of option grants and equity-based compensation in private firms is non-trivial, suggesting that at least some private firms provide significant compensation incentives for CEOs to transition to public ownership in order to monetize their option and stock holdings. In addition, the evidence indicates that the pay premium in public firms is driven mainly by the fact that public firm CEOs receive considerably more restricted stock and option pay compared to private firm CEOs.

Comparing the pay-performance sensitivity of CEO compensation in the two types of firms we find that pay responds positively to both stock and accounting performance in public firms, but that pay is largely unresponsive to performance in private firms. In particular, there is little evidence that private firm pay is positively related either to firm-specific accounting earnings or to stock returns of publicly traded firms in the same industry. These results are robust to controlling for ownership differences between the two firm types, and suggest that private firms rely more on subjective incentive measures compared to public firms, which is consistent with the evidence in Ke, Petroni, and Safieddine (1999).

One interpretation of the large public firm pay premium and the fact that private firm pay does not respond to stock returns in public peer firms is that the labor markets between the two types of firms are largely segmented. Consistent with this view, we find that after controlling for firm size and performance, there is no evidence that changes in private firm pay are correlated with changes in CEO pay of public firms in the same industry. Finally, we also show that CEOs receive large and permanent increases in pay when firms transition from private to public ownership.

The paper is organized as follows. Section 2 reviews the literature. Section 3 describes the data, and Section 4 presents the empirical analysis. We conclude in Section 5 with a brief summary.

2. Prior Literature

The principal-agent conflict is one of the most well-examined conflicts in corporate finance. Starting with Jensen and Meckling's (1976) discussion of the agency costs associated with the separation of ownership and control in modern corporations, many papers have explored the incentive mechanisms that overcome this conflict using data from public firms around the world (see the survey by Murphy (1999), and a recent paper on CEO pay comparison across countries by Fernandes, Ferreira, Matos, and Murphy (2009)).

Our paper is related to a small strand of the vast CEO pay literature focusing on CEO pay in private firms. Using a sample of 45 privately-held and 18 publicly-held insurers over 1994-1996, Ke, Petroni, and Safieddine (1999) show that there is a significant positive association between return on assets (*ROA*) and the level of compensation for publicly-held

insurers while there is no such relation for privately-held insurers. They further show that the change in compensation is significantly more sensitive to the change in return on assets for publicly-held insurers than privately-held insurers. They conclude that their results are consistent with the optimal contracting theory view of CEO pay where ownership affects the relation between pay and performance. Further, they suggest that within privately-held firms, CEO pay is less based on objective measures like accounting information and more on subjective measures.

Confirming the above evidence using CEO pay from the 1993 Survey of Small Business Finances (SSBF, i.e. businesses with less than 500 employees), Cavalluzzo and Sankaraguruswamy (2000) conclude that ownership structure (varying from a single owner to multiple owners where the information on the ownership of the largest shareholder is available) plays an important role in the use of accounting information (ROA and sales) in CEO pay contracts for privately-owned small businesses.

Cole and Mehran (2008) use both the 1993 and 2003 SSBF data. They find that CEO pay at privately held firms is higher at larger firms and varies widely by industry. Over time, CEO pay in privately held firms does not grow as fast as its counterpart in public firms. Further, the pay-size elasticity is much larger for privately held firms than for the publicly traded firms. Finally, CEO pay in privately held firms is related to organizational structure of the firm (C versus S corporations), ownership, firm risk, and some CEO characteristics including age, education, and gender. Note that the firms surveyed are the smallest firms in the economy while, in contrast, the private firms in our sample are more comparable to public firms.

Bengtsson and Hand (2010) focus on CEO pay in venture-backed companies. Using

data from proprietary surveys conducted by VentureOne over the period 2002-2006, they document that controlling for firm location, industry, size, and operating performance, CEO cash pay is higher in firms that have successfully raised more VC financing and higher quality VC financing. Further, 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.

Nakazato, Ramseyer, and Rasmusen (2009) compare compensation patterns at privately and publicly held firms using individual-level tax liability data from Japan. They find that executives in private and public firms earn approximately equal incomes, and firm size is a strong determinant of compensation for both types of firms. There is a stronger association between operating performance and CEO pay in public firms than in privately held firms. Given the vast legal and regulatory differences between Japan and US and the difficulty in identifying the top executive of a company (President in their study), it is not clear to what extent their findings could be generalized to US firms.

Our paper is particularly motivated by two recent studies that examine compensation practices across different types of public US firms, and across public firms in different countries. Using compensation data for non-ExecuComp firms for the fiscal years 2000-2007 from the Morningstar Historical Governance database Cadman, Klasa and Matsunaga (2009) compare CEO pay practices in non-ExecuComp firms with those in ExecuComp firms. They show that ExecuComp firms rely more heavily on earnings and stock returns in determining CEO cash pay. Further, the weight on earnings is more sensitive to differences in growth opportunities for ExecuComp firms. Finally, they show that the positive relation between institutional ownership concentration and the value of stock

option grants is stronger for ExecuComp firms. They conclude that ExecuComp and non-ExecuComp firms adopt very different CEO compensation contracts.

Using 2006 compensation information for CEOs in 3,798 firms across 27 countries, Fernandes, Ferreira, Matos, and Murphy (2009) show that top executives in the US are paid more than their counterparts in foreign companies. After controlling for firm, industry, corporate governance, and CEO characteristics, the US pay premium remains statistically significant at 40%. Moreover, they show that the remaining cross-country difference in pay levels is explained by differences in the structure of pay: CEOs are paid more in firms with a higher percentage of incentive pay (particularly equity-based pay), and CEOs in the US receive a much larger fraction of their pay through equity-based pay (primarily stock options and restricted shares), thus contributing to the observed US pay premium.

3. Sample Formation and Variable Construction

3.1 Sample Formation and Overview

Our primary data source is the Capital IQ (CIQ) database that combines in one platform comprehensive information on global public and private companies and their executives.² Capital IQ is an affiliate of Standard & Poor's which produces the Compustat database.

Since the late 1990s, CIQ starts to provide data on executive compensation for both private and public US firms. When available, CIQ provides data on CEO salary, bonus,

² As of May 2010, CIQ has coverage on 58,000 public companies including 44,000 international companies, and 1,741,000 significant private companies. The data on coverage is provided at: https://www.capitaliq.com/main3/ourproducts_platform_fundamentals.asp. Note however, that most of the private firms covered by CIQ have very limited amounts of data available. For all covered firms, CIQ provides links to the company filings so that users can easily check the original source data.

restricted stock and option grants, total annual compensation, as well as firm accounting information with a similar level of detail as provided by Compustat and Execucomp for public firms. Unique to CIQ, it also provides detailed background information about the CEO, including education, gender, past experience, and age.

We start with all private and public US firms with non-missing values for total assets in CIQ from 1999 to 2008. We require that public firms be traded in NYSE, AMEX, or NASDAQ. CIQ classifies a firm's public versus private status based on its most recent status. For example, Google is classified as a public firm throughout the firm's history in CIQ even though it became a public firm only in 2004. We search all the key dates for each firm in CIQ's IPO and delisting databases, to help classify a firm's private (or public) status by back filling. In the Google example, given that its IPO was in August 2004, Google in our sample is a private firm from 1999 to 2003 and it becomes a public firm from 2004 onward. To clearly capture any difference in pay for public versus private firms, in most of our analyses, we omit the transitioning firm-year observation when a firm changes from being a private firm to becoming a public firm and vice versa.

This initial sampling, shown in Panel A of Table 1, results in 179,877 candidate firm-year observations for private firms and 51,341 firm-year observations for public firms. Note that there is a large increase in private firms covered by CIQ beginning in 2004. Next we narrow the sample by requiring the firms to have compensation data available in CIQ. For private firms this restriction is meaningful and reduces the sample to a total of 7,767 firm year observations representing 2,767 unique firms, while for public firms we retain a sample of 38,041 firm-year observations representing 5,786 unique firms. The final column in Panel A shows the number of public firms in our sample that overlap with the ExecuComp

firms. It is clear that over the sample period, the public firms in our sample are more representative of public firms in the economy as compared to the S&P 1500 firms covered by the ExecuComp database.

Perhaps not surprisingly, many private firms do not report compensation data. To provide some assessment of the selection issues inherent in our sample, Panel A also reports the median values of sales for the firms in the CIQ population and for those firms in our final sample. The private firms that report compensation in our data are significantly larger than private firms in the overall CIQ population, whereas, for public firms the differences are more modest. The fact that our private firm sample is biased toward larger firms actually makes our sample more comparable to public firms especially as compared to other studies of private firms that use data from the SSBF (Cole and Mehran (2008) and Cavalluzzo and Sankaraguruswamy (2000)). For example, in the overall sample, the median sales of private firms is \$173 million compared to \$236 Million for public firms. By way of comparison, Cole and Mehran (2008) report median revenues of \$1.9 million in 2003 for their sample of private firms drawn from the SSBF data. Nevertheless, the reader should bear in mind the sample selection criteria imposed on us by the data when deciding how our results might generalize.

In Appendix 1, we provide a breakdown of the data sources from which CIQ obtains compensation information for private firms. Data for over half of the private firm-years in our sample come from 10-K (annual reports) filed with the SEC, a quarter of the firm-years come from filings of forms S-1 or DEF14 (proxy statements) with the SEC due to public debt issuance, and 6% of firm years are from leveraged buyouts during the sample period. We do not have information on the data source for the rest (about 20% of our private firm sample).

It is worth noting, that the private firms in our sample are those with a relatively high level of disclosure compared to other private firms in the economy. One would expect that this would lessen any differences in pay practices compared to public firms.

Panel B presents the industry distribution of our private firm sample and public firm sample based on the industry classification in Fama and French (1997). It is clear that our sample firms have broad industry representation, covering all 48 industries, with Business Services, Banking, and Utilities having the highest representation among private firms, while Banking, Business Services, and Electronic Equipment have the highest representation among public firms. It is worth noting that the extent of overall industry representation is much broader in our sample of firms as compared to prior work examining CEO pay in private firms (for example, Ke, Petroni, and Safieddine (1999), and Cole and Mehran (2008)).

3.2 Computing CEO Pay

We define a CEO's total compensation (*Totalpay*) in a given year as the sum of his/her salary, bonus, the grant-date value of restricted stock awards (*Stock*), and the Black-Scholes value of granted options (*Option*), and other pay that includes items such as long-term incentive plans, premiums for insurance policies, and medical expenses.

Some private firms in our sample pay their CEOs with restricted stock, and they report the dollar value of restricted stock granted based on a hypothetical market price. In our analysis, we take the value of restricted stock granted as reported.

With respect to the value of option grants, unlike ExecuComp, CIQ simply records the value of options granted as reported by the filing firm in its 10-K, Proxy statement, Annual

report, or other filing. If the firm just reports the number of shares underlying the options grant, CIQ records a zero value for the option grant. To avoid this problem and to provide a comparison with options granted to CEOs in public firms we estimate the value of option grants for all firms (both public and private) in our sample in a manner that is comparable to the ExecuComp approach as follows.

For public firms, we retrieve relevant information about the CEO's option grants (including the number of options, strike price, grant date, and expiration date) from the Thomson Financial Insider Trading database. We then calculate the dollar value of each option grant, based on ExecuComp's modified Black-Scholes approach.³

For private firms, we read their filings available through CIQ and hand collect relevant information about the CEO's option grants. We note that it is not uncommon for a private firm to provide option grants to their top executives, even though the firm does not have publicly traded shares. For each option grant, the firm typically states the expiration date and a hypothetical exercise price. We compute the option grant's Black-Scholes value, by making the following assumptions: (1) volatility is the median volatility of public firms in the same industry; (2) grant-date stock price is the exercise price (the option is granted at-the-money); (3) time to maturity is 70% of the stated maturity; (4) the dividend yield is zero; and (5) the risk-free rate is the seven-year Treasury bond yield prevailing on the grant date.

Appendix 2 provides a detailed example of how we compute total CEO pay in private

³ To compute option values ExecuComp assumes that the volatility is the annualized standard deviation of stock returns during the 60 months prior to the grant date; the risk-free rate is the seven-year Treasury bond yield prevailing on the grant date; the dividend yield is average dividend yields over a three-year period prior to the grant; and the time to maturity is equal to 70% of the stated maturity.

firms, and in Appendix 3, we conduct a cross-check of CEO pay variables between CIQ (using our own approach) and ExecuComp using the overlapping firms in our sample of public firms. The data quality from CIQ appears to be comparable to that of ExecuComp.

3.3 Summary Statistics

Table 2 presents descriptive statistics of our private firm sample and public firm sample. All dollar values are in 2008 dollars. All continuous variables are winsorized at the 1st and 99th percentiles. Panel A presents descriptive statistics of CEO pay. The mean (median) CEO total pay is \$1.38 million (\$519 thousand) for the private firm sample, while the mean (median) CEO total pay is \$2.74 million (\$1.01 million) for the public firm sample. The two-sample t-test and median-test both reject the null that the CEO total pay in private firms is the same as that in public firms at the 1% level. On average, total pay in public firms is approximately twice that in private firms.

The mean (median) CEO salary and bonus in private firms is \$386 thousand (\$313 thousand) and \$351 thousand (\$54 thousand), respectively, while the mean (median) CEO salary and bonus in public firms is \$507 thousand (\$420 thousand) and \$536 thousand (\$150 thousand), respectively. The median value of restricted stock and option grants is zero in both samples. The mean value of CEO restricted stock and option grants in private firms is \$125 thousand and \$188 thousand, respectively, while the mean value of CEO restricted stock and option grants in public firms is \$346 thousand and \$992 thousand, respectively. The two-sample t-test and median-test both reject the null that the value of CEO restricted stock and option grants in private firms is the same as that in public firms at the 1% level. Finally, the mean (median) value of CEO other pay in private firms is \$177 thousand (\$13 thousand),

and the mean (median) CEO other pay in public firms is \$190 thousand (\$24 thousand). In summary, CEO total pay is significantly lower in private firms as compared to pay in public firms. The pay difference shows up in the cash component of total pay: salary and bonus, but is particularly evident in the equity-based components of pay: restricted stock and options grants.

Panel B presents descriptive statistics of CEO characteristics. CEOs in private firms are slightly less likely to obtain an MBA degree: 15% of CEOs in private firms have an MBA, while 17% of CEOs in public firms have an MBA. Further, there are slightly more female CEOs, fewer founders, and fewer CEOs serving as Chairman of the Board in private firms as compared to public firms. Finally, CEOs in private firms are younger than their counterparts in public firms. All these CEO characteristics are statistically different across the two samples at the 1% level.

Panel C presents descriptive statistics of firm performance and other characteristics. We show that private firms are smaller than public firms. The mean (median) sales of private firms is \$938 million (\$173 million), while the mean (median) sales of public firms is \$1,879 million (\$236 million). Using total assets as a measure of firm size yields the same conclusion. The accounting performance of private firms is somewhat weaker than that in public firms: the mean (median) contemporaneous ROA of private firms is -7.56% (2.19%), while the mean (median) contemporaneous ROA of public firms is 0.82% (3.13%). Looking at the lagged accounting performance across the two samples yields a similar inference.

For stock market related measures, given that private firms by definition, are not publicly listed, we use the annual return of the value-weighted industry portfolio as a proxy for stock returns of private firms. The return volatility of private firms is computed as the

median volatility of public firms in the same industry (Note that using the mean volatility of public firms in the same industry gives similar results). Volatility of public firms is computed as the annualized standard deviation of firm-specific returns over the last 60 months. By construction, the return and volatility measures of private firms are roughly comparable with those of public firms.

Further, we show that private firms grow slightly slower than public firms using the median value of sales growth. Private firms spend more on capital expenditures: the mean (median) capital expenditures over total assets of private firms is 4.81% (2.61%), while the mean (median) capital expenditures over total assets of public firms is 4.23% (2.49%). Public firms hold more cash than private firms. The leverage of private firms is far higher than that of public firms: the mean (median) total debt over total assets of private firms is 42% (35%), and the mean (median) total debt over total assets of public firms is 19% (14%), consistent with the fact that private firms must rely on debt and internally generated equity, while public firms are able to tap the public equity markets. Finally, private firms are younger than public firms: the mean (median) firm age of private firms is 31 (15) years old, and the mean (median) firm age of public firms is 41 (25) years old.⁴

Panel D presents the correlation matrix of firm and CEO characteristics. The extent of correlation among most pairs of firm and CEO characteristic variables raises little concern for multicollinearity.

Overall, although there are significant differences in the characteristics of the two firm types, in comparison to the private firms covered in the SSBF (for example, Cavalluzzo and

⁴ All the two-sample t-tests and median-tests of the null that the mean (median) value of a particular firm characteristic of the public firm sample is equal to that of the private firm sample is rejected at the 1% level, with the exception that for capital expenditures, the significance is at the 5% level.

Sankaraguruswamy (2000), and Cole and Mehran (2008)), our sample of private firms are much more representative of listed firms.

4. Comparing CEO Pay in Public and Private Firms

The univariate analysis in the previous section indicates that public firm CEOs receive higher pay on average compared to private firm CEOs, but that the two types of firms also differ along other dimensions such as firm size, etc. To the extent that CEOs in public and private firms perform similar tasks and are drawn from the same talent distribution, we expect that CEOs in public and private firms will have similar levels of pay. In this section we provide a formal analysis of differences in pay levels, pay structure, and how pay responds to performance between public and private firms.

4.1 Differences in Pay Levels Between Public and Private Firms

To begin, Figure 1 plots average CEO total pay and firm size (based on sales) for both public and private firms over time. As seen in the figure, there are distinct upward trends in CEO pay and in firm size in both public and private firms. A statistical test cannot reject the null that there are no differences in the time trends of CEO pay and firm size between the public and private firms. This result differs from that in Cole and Mehran (2008), who report that total pay in their sample of small private firms actually fell between 1993 and 2003. Instead, our findings suggest that the link between the growth in pay and firm size for public firms documented in Gabaix and Landier (2005) is also present in large private firms.

In addition to the time trend in pay, the figure also shows that CEO pay and firm size of private firms lie below those of public firms in every sample year. To explore these

differences in pay we test for the existence of a public firm CEO pay premium relative to private firm CEOs. We employ an approach similar to the one used in Fernandes, Ferreira, Matos, and Murphy (2009) to examine cross-country pay differences by estimating the following OLS regression:

$$\begin{aligned} \ln(\text{CEO Pay}) = & \alpha + \beta_1 \text{Public} + \beta_2 \text{Firm Size} + \beta_3 \text{Other Firm Characteristics} \\ & + \beta_4 \text{CEO Characteristics} + \text{Industry FE} + \text{Year FE} + \varepsilon \end{aligned} \quad (1)$$

where the dependent variable is the natural logarithm of either CEO total pay or cash pay. *Public* is an indicator variable that takes the value of one if the firm is a public firm in that year, and zero otherwise. We introduce firm size, other firm characteristics, and CEO characteristics in stages when presenting our regression results. We also include industry fixed effects to control for unobserved industry-specific heterogeneity and year fixed effects to account for the time trend. The coefficient estimate on the *Public* indicator variable thus measures the difference in pay between public and private firms that cannot be accounted for by differences in firm and CEO characteristics and industry and year effects. Table 3 presents the results.

Column (1) of Panel A reports the results from estimating Equation (1) controlling for firm size, industry and year fixed-effects. The coefficient on the public firm indicator variable of 0.342 implies that the predicted CEO pay is 41% ($e^{0.342} - 1$) higher in public firms than that in private firms after controlling for firm size, and industry and year fixed-effects. In Column (2), we introduce other firm characteristics that are commonly used to explain CEO pay including firm operating and stock performance, firm risk, sales growth, investment, cash holdings, leverage, and firm age (see for example, Cadman, Klasa, and Matsunaga (2009)). We see that there is a negative and significant association between CEO

total pay and firm operating performance and a positive and significant association between CEO total pay and stock performance in the cross-section.⁵ Importantly, the coefficient on the public firm indicator variable drops from 0.342 in Column (1) to 0.233 in Column (2), suggesting a public firm pay premium of 26%, after controlling for firm characteristics, and industry and year fixed effects.

Prior work such as Core, Holthausen, and Larcker (1999), and Fernandes, Ferreira, Matos, and Murphy (2009) show CEO characteristics are also important determinants of CEO pay. Column (3) presents the results when we include both firm and CEO characteristics, as well as industry and year fixed-effects. CEOs with an MBA degree and CEOs who are also Chairman of the Board receive higher pay, while CEOs who are founders receive lower pay. Nevertheless, the coefficient on the public firm indicator variable remains positive and significant, implying a public firm pay premium of 24%, after controlling for firm and CEO characteristics, and industry and firm fixed-effects.

Columns (4) through (6) present the results when the dependent variable is cash pay. The coefficient on the public firm indicator variable is always positive and significant under different model specifications, and the estimates imply a public firm pay premium in CEO cash pay ranging from 9% to 19%.

To explore how the public firm pay premium varies over time we estimate individual cross-sectional regressions identical to those in columns (3) and (6) except without the year fixed-effects. We then plot the pay premium implied by the coefficient estimates on the public firm indicator variable over time. The data are presented in Figure 2. As seen in the

⁵ The negative relation between pay and operating performance in the cross-section is also documented in Fernandes, Ferreira, Matos, and Murphy (2009). See Murphy (1985) for an argument of why one might observe a negative relation between pay and performance in cross-sectional regressions. We examine pay-performance sensitivity directly later in the paper.

figure, there is an upward trend in the pay premium over time, indicating that the pay gap between public and private firm CEOs has widened over time. To quantify this trend we estimate a simple OLS regression of the pay premium on a time trend. The regression coefficient on the time trend is 0.029 (p-value = 0.04) when the dependent variable is total pay; and the coefficient on the time trend is 0.017 (p-value = 0.03) when the dependent variable is cash pay. All else equal, it has apparently become more lucrative to manage a public company as compared to a private company over time.

One potential issue with our results is that it is likely that CEO's in private firms have substantially higher ownership compared to CEOs in public firms and because of their significant ownership stakes they require lower levels of annual compensation. To address this concern, we collect CEO ownership data for our sample firms for year 2008.⁶ The summary statistics are presented in Table 4 Panel A. As expected, CEO ownership is indeed higher in private firms and is particularly high when the CEO is also the founder. At the median, the differences in ownership between non-founder CEOs in public and private firms is less dramatic. In the last row in the panel, we add the number of option shares (both current and outstanding) to CEO ownership for public firms. We multiply the number of option shares by 0.6 to reflect the average delta of stock options as in Murphy (1999). For non-founder CEOs, the median fractional ownership is 2.51% in private firms and is 0.29% (0.85%) in public firms when options are not (are) included.

In Panel B we re-estimate the regressions in Table 3 controlling for founder status (as was done previously) and CEO ownership. As seen in the Table, the expected negative

⁶ CIQ does not provide CEO ownership during our sample period. For private firms, we hand collect the ownership information from the firm's filings in CIQ. For public firms, we obtain ownership data from ExecuComp and the firms' filings in CIQ. We are presently collecting ownership data for the remaining sample years.

relationship between ownership and pay shows up in the data, but the coefficient on the public firm indicator variable remains statistically significant and the magnitude of the pay premium is similar in magnitude to that reported in Figure 2, for 2008. Differences in ownership do not appear to account for the substantial public pay premium.

4.2 Differences in Pay Structure Between Public and Private Firms

The analysis above indicates a modest premium in cash pay for public firm CEO's of about 9% after controlling for firm and CEO characteristics, but a much larger premium in total pay of 24%. This suggests that most of the difference in pay levels is driven by differences in the amount of equity-based pay (restricted stock and options) used by the different firm types. To examine this issue, we estimate regressions similar to Equation (1), but where the dependent variable is either the ratio of cash pay to total pay, or the ratio of equity-based pay to total pay. Table 5 presents the results.

Columns (1) through (3) report the results when the dependent variable is the ratio of cash pay to total pay. We show that compared to private firm CEOs, public firm CEOs receive a significantly lower fraction of their pay as salary and bonus. The coefficient estimate on the public firm indicator variable is around -0.08 and significant at the 1% level. Further, the cash pay ratio is negatively related to firm size, positively associated with operating performance, and negatively associated with lagged stock price performance. Founders and older CEOs also receive more of their total pay in the form of salary and bonus. In contrast, Columns (4)-(6) show that compared to private firm CEOs, public firm CEOs receive a significantly higher fraction of their total pay in the form of restricted stock and options. The coefficient estimate on the public firm indicator variable is around 0.11 and

significant at the 1% level. Further, the equity-based pay ratio is negatively associated with operating performance, but is positively associated with lagged stock price performance.

CEOs with an MBA degree and CEOs who are also Chairman of the Board receive more of their total pay in the form of restricted stock and option grants. Although, not reported, the results remain similar if we control for ownership using the 2008 data as in Table 4.

4.3 Differences in Pay-Performance Sensitivity Between Public and Private Firms

In addition to the levels of pay, a large literature also examines how pay changes in response to firm performance. To examine how pay responds to firm performance we follow an approach similar to that used by Murphy (1985) and Aggarwal and Samwick (1999) and estimate the following panel data regression with firm-fixed effects:

$$\begin{aligned} \ln(\text{CEO Pay}) = & \alpha + \beta_1 \text{Public} + \beta_2 \text{Firm Size} + \beta_3 \text{ROA} + \beta_4 \text{Lagged ROA} + \beta_5 \text{Stock Return} + \\ & \beta_6 \text{Lagged Stock Return} + \beta_7 \text{Public} \times \text{ROA} + \beta_8 \text{Public} \times \text{Lagged ROA} + \beta_9 \text{Public} \times \text{Stock Return} + \\ & \beta_{10} \text{Public} \times \text{Lagged Stock Return} + \beta_{11} \text{Other Firm Characteristics} + \beta_{12} \text{CEO Characteristics} + \\ & \text{Firm FE} + \text{Year FE} + \varepsilon \end{aligned} \quad (2)$$

where the dependent variable is CEO total pay. We include year fixed effects to account for the time trend in pay. The inclusion of firm fixed-effects allows us to interpret the coefficient estimates on the firm performance variables as measures of pay-performance sensitivities (see Aggarwal and Samwick (1999)). The interaction terms measure the incremental differences in pay-performance sensitivity in public firms relative to that in private firms. Table 6 presents the results. We focus on the case where total pay is used as the dependent variable, but obtain similar results when we focus only on cash pay (not reported).

Columns (1) and (2) present the full sample results, while Columns (3) and (4) present the results from estimating separate regressions within the private and public firm samples, respectively. The coefficient estimates on ROA and lagged ROA indicate that pay is largely unresponsive to accounting performance in private firms. In contrast, the coefficient estimates on the interactions between the public firm indicator variable and the ROA measures are both positive and statistically significant, indicating that pay responds positively to accounting performance for public firms. For private firms, there is some evidence that pay responds positively to the contemporaneous stock price performance of public firms in the same industry, while for public firms, there is stronger evidence that pay responds to both current and lagged firm-specific stock returns.

To provide additional evidence on how pay responds to performance in the two types of firms, Columns (3) and (4) estimate the regressions separately for the two types of firms. The results largely mirror those in the full sample regressions, with the exception that private firms show some pay-performance sensitivity to lagged accounting performance. Again, there is no evidence that the pay in private firms responds to stock returns of their publicly traded industry peers. In contrast, pay responds positively to both accounting and stock price performance in public firms similar to what has been documented elsewhere in the literature. Based on the coefficient estimates, a 1% increase in current (lagged) ROA is associated with a 0.27% (0.27%) increase in CEO pay in public firms. For private firms, only lagged accounting performance appears to have any effect on CEO pay. Similarly, a 1% increase in current (lagged) stock returns translates into a 0.13% (0.14%) increase in CEO pay in public firms, but has no effect on pay in private firms.

The results deserve some discussion. It is puzzling that private firm pay does not

respond to accounting performance. The standard principal agent model suggests that pay should be tied to observable measures of managerial effort in order to provide managers with incentives to increase firm performance. For private firms, accounting performance would seem to be a natural measure of managerial effort. One possibility is that monitoring is less costly in private firms and that these firm tend to rely more on subjective performance measures. Alternatively, the higher CEO ownership in private firms may already provide sufficient incentives, such that additional incentives are not needed. To examine this latter issue, we use the ownership data from 2008 to classify firms into high and low ownership groups based on the sample median value of ownership. Because we only have ownership data for 2008 we assume that the current ownership level is representative of the firm's ownership level in prior years as well. We then re-estimate the regressions in Columns (3) and (4) within each ownership group (results not reported). We find no evidence of a stronger relationship between pay and performance of private firms in the low ownership group, suggesting that differences in ownership cannot account for the lack of pay-performance sensitivity in private firms.

Another interesting result is the lack of sensitivity of private firm pay to stock returns of publicly traded peer firms in the same industry. To the extent that working for a public firm reflects the outside opportunities for CEOs of private firms, we would have expected that private firm CEO pay would also be correlated with the stock returns of their public peers in the same industry. The fact that private firm CEO pay is unresponsive to the stock price performance of similar publicly traded firms, along with the significant pay premium in public firms that we documented earlier suggests that the labor markets for public and private firms are segmented, in the sense that increases in the value of public firms do not appear to

increase the outside opportunities for CEOs in private firms.

4.4 Labor Market Segmentation in Public and Private Firms

To provide additional evidence on labor market segmentation we regress the change in pay in private firms on the change in firm size, and both contemporaneous and lagged firm performance measures. We then add to this regression the change in pay of a representative public firm in the same industry. To the extent that the labor markets are integrated we expect a positive correlation between the changes in pay in private and public firms after controlling for changes in firm characteristics. The results of this analysis are reported in Table 7. Columns (1) and (2) reports the results using the average change in pay of industry peer public firms, while Columns (3) and (4) use the median change in pay of public firms in the same industry. In all regressions, the change in private firm pay is significantly related to changes in firm size, but is unrelated to past or contemporaneous accounting performance or to the stock price performance of public firms in the same industry. After controlling for firm characteristics, there is no significant relation between changes in private firm pay and changes in the pay levels of similar publicly traded firms. The results provide further evidence that labor markets for private and public firms are segmented.

4.5 Changes in Pay and the Transition from Private to Public Status

As a final analysis, we examine changes in pay for the set of firms in our sample that transition from private to public status. We identify 574 firms in our sample that transition from private to public status and track their CEO pay for a period of three-years prior and three-years following the transition year. Figure 3 plots the levels of pay and the ratios of

cash and equity-based pay around the IPO year. We report results both for the full sample of transitioning firms as well as for a subsample of 282 firms where the same CEO remains with the firm over the three year period beginning one year prior and ending one year after the IPO.

Panel A of the figure shows that the mean total pay increases significantly at the time of the IPO and remains permanently higher than before the IPO. Panel B shows that similar results hold in the subsample where the CEO remains in place around the IPO. Consistent with the results regarding the pay premium that we documented earlier, Panel B shows that cash pay increases only modestly around the IPO indicating that most of the increase in the level of pay comes from CEOs being given significantly more equity incentives following the IPO. The increase in equity-based pay is not however accompanied by a corresponding decrease in the level of cash pay, which also increases following the IPO. Panels E and F underscore this change in the structure of pay showing that the proportion of total pay from salary and bonus falls significantly after the IPO. Overall, the results indicate a significant permanent shift in both the level and structure of pay as firms transition from private to public status that is largely driven by CEOs being given additional equity incentives following the IPO.

4.6 Additional Tests

To ensure the robustness of our findings we have implemented a number of robustness tests (unreported). First, instead of using sales to measure firm size in different pay regressions, we have tried both book value of total assets and market capitalization. In both cases, our main findings remain. In Figure 1, we plot the time trend in the sample mean of

firm size and CEO pay for the public and private firm samples. When we use the sample median measures, we still observe similar time trends in both firm size and CEO pay for public and private firms.

Finally, the substantial pay premium that CEOs of public firms receive deserves some further discussion. There are two offsetting effects on CEO compensation of having listed shares. On the one hand, CEOs of listed firms have access to a more liquid capital market for selling their shares, which should imply lower pay all else equal. On the other hand, the exposure to equity price risk in the capital market would imply a larger risk premium for equity-based pay in public firms. To explore whether exposure to equity price risk can explain the substantial pay premium that we document, we follow the method developed by Meulbroek (2001) and compute the risk-adjusted pay for the public firm CEOs in our sample. We then repeat the regressions in Table 3 using risk-adjusted pay as the dependent variable.⁷ Note that by only risk-adjusting the pay of public firms we provide a lower bound on the pay differences that could arise purely from differences in exposure to equity price risk. The coefficient on the public firm indicator variable in this case is 0.115 implying that the predicted risk-adjusted CEO pay remains 12% ($e^{0.115} - 1$) higher in public firms compared to pay in private firms after controlling for firm and CEO characteristics, and industry and year fixed-effects. Recall that that without risk-adjusting CEO pay in our sample firms, the public firm CEO pay premium is 24%.

⁷ Specifically, in Meulbroek's framework, the risk-adjusted value of the firm's stock to its undiversified CEO depends on the firm specific volatility, the market portfolio volatility, beta and market excess return; the risk-adjusted value of the firm's stock option can be obtained by applying Black-Scholes formula by replacing the firm's market stock price with the risk-adjusted stock price. We follow Meulbroek's method to get the risk-adjusted stock and option values for public firms. For private firms in our sample, the risk-adjusted stock and option values are based on the industry-median parameters of the public firms. Salary and bonus are not affected by this risk-adjusted method.

5. Conclusions

We provide some of the first large-sample evidence on differences in CEO compensation in public and large private US firms from the period 1999-2008. Both public and private firm pay increases at the same rate over time as does firm size, which is roughly consistent with the arguments of Gabaix and Landier (2008). However, we find that, all else equal, public firm CEOs earn a 24% pay premium over private firm CEOs, which is largely driven by differences in the amount of stock and option pay between the two firm types. In addition, public firm pay is positively related to both accounting and stock price performance, while private firm pay is basically unrelated to firm performance. The public firm pay premium combined with the fact that private firm pay does not respond to changes in firm value in the listed firm sector suggests that public and private firms operate in segmented labor markets.

Finally, we show that there is a significant and permanent change in both the level and structure of pay when firms transition from private to public status that is largely driven by additional equity incentives that are given to CEOs once the firm is listed.

The analysis indicates that a number of stylized facts from the analysis of public firm CEO pay are also descriptive of private firm pay, while others are not. The substantive differences that we document are particularly interesting given that our sample of private firms have a relatively high level of disclosure compared to many private firms and are also more comparable to public firms in terms of size and other accounting measures. Future research, will attempt to link these differences in pay practices more directly to differences in the contracting environment faced by the different types of firms.

Appendix 1:
Data Sources of Private Firms Covered by CIQ

The sample of private firms consists of 7,767 firm-year observations from 1999-2008, obtained from CIQ. The last column reports the accumulative number of private firms that were taken private in LBO. The information about the firm's filings, public debt and historical LBO record is also obtained from CIQ.

Year	Private Firms	Private Firms with 10-K Filings	Private Firms with Public Debt as of December 31, 2008	Private Firms Involved in LBOs
1999	627	280	59	8
2000	749	416	136	20
2001	849	486	182	21
2002	869	488	220	26
2003	941	445	245	46
2004	890	427	242	56
2005	767	392	224	61
2006	763	358	217	73
2007	661	318	214	84
2008	651	547	221	79
Total	7767	4157	1960	474

Appendix 2: Computing CEO Pay in Private Firms

Mr. Daniel Thomas is the CEO of Concentra Operating Corp. The company was founded in 1979, based in Addison, Texas, and operates in the healthcare industry. In 2004, Mr. Thomas received \$568,654 as salary, \$850,000 as bonus, \$1,636,500 as restricted stock grant, 200,000 shares of options grant, and \$18,146 as other compensation which consists of his life insurance policy and medical examination expenses.

With respect to the restricted stock grant, the footnote of the filing stated, “Because there is no active trading market for Concentra’s common stock, we rely on the Compensation Committee to determine in good faith the fair value of securities underlying awards at the time they are granted...”

The firm’s filing also provided relevant information about the options grant: It expires in 10 years, has a strike price of \$15. We apply the Black-Scholes formula with the following input:

Strike price: 15

Volatility: 0.58 (the median volatility of public firms in the healthcare industry)

Risk-free rate: 3.94% (the 7-year Treasury bond yield prevailing on the grant date)

Grant-date price: 15 (assuming that the option is granted at-the-money)

Dividend yield: assumed to be zero

Time to maturity: $70\% \times 10 = 7$ years (following ExecuComp’s method, we apply 70% of the stated time to maturity)

In the end, we obtain a value of \$1,850,604 for his options grant.

The total compensation for Mr. Thomas in year 2004 is thus \$4,923,904 (\$568,654 + \$850,000 + \$1,636,500 + \$1,850,604 + \$18,146).

Concentra Operating Corp. Form 10-K filed on Mar-29-2006 - Microsoft Internet Explorer provided by Nanyang Business School

https://www.capitaliq.com/CIQDotNet/filings/SECPopUp.aspx?dcn=0001193125-06-067009&activetext=568,654_08pageValue=568654&cId=15418223f/ieDate=12/31/2004#active

Capital IQ Concentra Operating Corp. Form 10-K filed on Mar-29-2006

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ITEM 11. EXECUTIVE COMPENSATION

Summary Compensation Table

The following table summarizes the compensation paid or earned for the fiscal year 2005, 2004, and 2003 to Concentra Holding's and Concentra Operating's Chief Executive Officer and the three most highly compensated executive officers of Concentra Holding and Concentra Operating other than the Chief Executive Officer serving in this capacity as of December 31, 2005. These executive officers are referred to as the named executive officers.

Name and Principal Position	Year	Annual Compensation			Long-Term Compensation Awards		All Other Compensation
		Salary (\$)	Bonus (\$) (1)	Other Annual Compensation (\$)	Restricted Stock Awards (\$) (2) (3)	Securities Underlying Options	(\$ (4))
Daniel J. Thomas	2005	\$569,615	\$ 38,281	—	\$ —	—	\$ 82,766
President and Chief Executive Officer, Director	2004	568,654	850,000	—	1,636,500(5)(6)	200,000	18,146
	2003	500,000	100,000	—	—	—	644
James M. Greenwood	2005	319,616	19,588	—	—	—	43,403
Executive Vice President - Corporate Development	2004	311,289	197,500	—	276,000(5)(6)	45,000	9,472
	2003	295,000	—	—	24,240	—	519
Thomas E. Kiraly	2005	349,808	9,783	—	—	—	26,395
Executive Vice President, Chief Financial Officer and Treasurer	2004	352,077	435,000	—	633,000(5)	120,000	10,472
	2003	320,000	85,000	—	90,910	—	1,525
Richard A. Parr II	2005	294,808	22,036	—	—	—	50,741
Executive Vice President, General Counsel and Corporate Secretary	2004	295,636	190,000	—	151,500(5)(6)	25,000	12,731
	2003	278,500	85,000	—	18,180	—	1,643

(1) The bonus amounts paid in 2005 were related to the termination of certain split-dollar life insurance agreements. Pursuant to such agreements, the Company paid the cost of

Appendix 3:

Cross Check of Compensation Data Between CIQ and ExecuComp Firms

The sample consists of 12,360 public firm-year observations that are included in both CIQ and ExecuComp from 1999-2008. All variables are in 2008 dollars. The corresponding data items in ExecuComp are *TDC1* for Totalpay, *RSTKGRNT* for Stock, and *OPTION_AWARDS_BLK_VALUE* for Option.

	CIQ		ExecuComp		Correlation Coefficient
	Mean	Median	Mean	Median	
Totalpay (\$K)	6689	4001	6614	4068	0.95
Salary (\$K)	783	742	799	759	0.95
Bonus (\$K)	1296	640	1109	620	0.87
Stock (\$K)	886	0	649	0	0.93
Option (\$K)	3702	1419	3598	1628	0.91
Sales (\$M)	5887	1665	6233	1734	0.99
Total Assets (\$M)	11847	2260	11863	2268	0.99

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Table 1. Sample Distribution

The sample consists of 7,767 private firm-year observations and 38,041 public firm-year observations from 1999-2008, obtained from CIQ. Panel A presents the sample distribution by year. The number in parentheses is the median sales (\$M) in 2008 dollars. The last column reports the number of sample public firms that overlap with the firms in ExecuComp. Panel B presents the sample distribution by industry.

Panel A: Distribution of Sample Firms by Year

Year	Our Sample		CIQ Population		Number of Our Sample Public Firms Overlapping with ExecuComp Firms
	Private Firms	Public Firms	Private Firms	Public Firms	
1999	627 (26)	3285 (216)	5085 (18)	5332 (193)	996
2000	749 (90)	3721 (208)	4571 (31)	5389 (174)	1127
2001	849 (200)	3866 (207)	4320 (45)	5280 (167)	1146
2002	869 (195)	3961 (203)	4476 (49)	5188 (186)	1204
2003	941 (195)	4107 (216)	4611 (60)	5117 (212)	1311
2004	890 (230)	3984 (233)	29344 (14)	5061 (239)	1281
2005	767 (230)	4042 (265)	39691 (15)	5095 (256)	1382
2006	763 (175)	3684 (259)	35063 (14)	5065 (284)	1246
2007	661 (227)	3667 (274)	26126 (15)	4940 (290)	1339
2008	651 (255)	3724 (297)	26590 (14)	4874 (306)	1328
Total	7767 (173)	38041 (236)	179877 (15)	51341 (226)	12360

Panel B: Distribution of Sample Firms by Industry

Fama and French 48 Industry	Private Firms	Percentage of Total Private Firms	Public Firms	Percentage of Total Public Firms	Total
1 Agriculture	66	0.85%	80	0.21%	146
2 Food Products	164	2.11%	432	1.14%	596
3 Candy & Soda	24	0.31%	145	0.38%	169
4 Beer & Liquor	17	0.22%	86	0.23%	103
5 Tobacco Products	14	0.18%	58	0.15%	72
6 Recreation	60	0.77%	268	0.70%	328
7 Entertainment	223	2.87%	374	0.98%	597
8 Printing and Publishing	155	2.00%	298	0.78%	453
9 Consumer Goods	132	1.70%	524	1.38%	656
10 Apparel	51	0.66%	428	1.13%	479
11 Healthcare	151	1.94%	712	1.87%	863
12 Medical Equipment	176	2.27%	1267	3.33%	1443
13 Pharmaceutical Products	250	3.22%	2349	6.17%	2599
14 Chemicals	207	2.67%	583	1.53%	790
15 Rubber and Plastic Products	104	1.34%	229	0.60%	333

16 Textiles	58	0.75%	121	0.32%	179
17 Construction Materials	121	1.56%	514	1.35%	635
18 Construction	68	0.88%	358	0.94%	426
19 Steel Works Etc	55	0.71%	463	1.22%	518
20 Fabricated Products	27	0.35%	80	0.21%	107
21 Machinery	163	2.10%	1083	2.85%	1246
22 Electrical Equipment	81	1.04%	574	1.51%	655
23 Automobiles and Trucks	74	0.95%	406	1.07%	480
24 Aircraft	25	0.32%	138	0.36%	163
25 Shipbuilding, Railroad Equipment	4	0.05%	57	0.15%	61
26 Defense	11	0.14%	89	0.23%	100
27 Precious Metals	20	0.26%	141	0.37%	161
28 Non-Metallic and Industrial Metal Mining	50	0.64%	141	0.37%	191
29 Coal	31	0.40%	76	0.20%	107
30 Petroleum and Natural Gas	170	2.19%	1367	3.59%	1537
31 Utilities	472	6.08%	1072	2.82%	1544
32 Communication	276	3.55%	1133	2.98%	1409
33 Personal Services	81	1.04%	438	1.15%	519
34 Business Services	884	11.38%	4605	12.11%	5489
35 Computers	201	2.59%	1384	3.64%	1585
36 Electronic Equipment	162	2.09%	2442	6.42%	2604
37 Measuring and Control Equipment	67	0.86%	819	2.15%	886
38 Business Supplies	98	1.26%	329	0.86%	427
39 Shipping Containers	16	0.21%	86	0.23%	102
40 Transportation	125	1.61%	872	2.29%	997
41 Wholesale	353	4.54%	1250	3.29%	1603
42 Retail	308	3.97%	1837	4.83%	2145
43 Restaurants, Hotels, Motels	296	3.81%	721	1.90%	1017
44 Banking	865	11.14%	4826	12.69%	5691
45 Insurance	212	2.73%	1321	3.47%	1533
46 Real Estate	164	2.11%	258	0.68%	422
47 Trading	305	3.93%	918	2.41%	1223
48 Other	130	1.67%	289	0.76%	419
Total	7767	100%	38041	100%	45808

Table 2. Descriptive Statistics

The sample consists of 7,767 private firm-year observations and 38,041 public firm-year observations from 1999-2008, obtained from CIQ. For public firms, we calculate the dollar value of each option grant, based on ExecuComp's modified Black-Scholes approach. When private firms in our sample pay their CEOs with restricted stock, we take the value of restricted stock as reported by the firm (*Stock*). With respect to the value of option grants for private firm CEOs, we hand collect relevant information and make the following assumption to compute the value (*Option*): (1) the volatility is the median volatility of public firms in the same industry; (2) the risk-free rate is the seven-year Treasury bond yield prevailing on the grant date; (3) the grant-date stock price is the exercise price (the option is granted at-the-money); (4) the dividend yield is zero; and (5) the time to maturity is 70% of the stated maturity. Total pay (*Totalpay*) is the sum of the CEO's salary, bonus, the grant-date value of restricted stock awards (*Stock*), and the Black-Scholes value of granted options (*Option*), and other pay. MBA, Male, Founder, and Chairman take the value of one if the CEO holds an MBA degree, is a male, is one of the firm's founders, and is Chairman of the Board, respectively, and zero otherwise. To measure stock performance, we use firm-specific stock return for public firms, and the return of value-weighted industry portfolio for private firms. Volatility for public firms is the annualized standard deviation of firm-specific returns over the last 60 months. Volatility for private firms is the median volatility of public firms in the same industry. Capex, Cash, and Book Leverage are all normalized by book value of total assets. All dollar values are in 2008 dollars. All continuous variables are winsorized at the 1st and 99th percentiles. Panel A presents descriptive statistics of CEO pay. Panel B presents descriptive statistics of CEO characteristics. Panel C presents descriptive statistics of firm characteristics. Panel D presents the correlation matrix of firm and CEO characteristics.

Panel A: CEO Pay Characteristics

	Private Firms		Public Firms	
	Mean	Median	Mean	Median
Totalpay (K)	1376	519	2743	1010
Salary (K)	386	313	507	420
Bonus (K)	351	54	536	150
Stock (K)	125	0	346	0
Option (K)	188	0	992	0
Other Pay (K)	177	13	190	24

Panel B: CEO Characteristics

	Private Firms		Public Firms	
	Mean	Median	Mean	Median
MBA	0.15	0	0.17	0
Male	0.96	1	0.98	1
Founder	0.12	0	0.15	0
Chairman	0.49	0	0.62	0
CEO Age	51.76	52	53.40	53

Panel C: Firm Characteristics

	Private Firms		Public Firms	
	Mean	Median	Mean	Median
Sales (M)	937.76	172.66	1879.09	235.92
Total Assets (M)	3058.75	220.66	5936.68	456.13
ROA	-7.56%	2.19%	0.82%	3.13%
Lagged ROA	-2.86%	2.79%	0.86%	3.23%
Stock Return	14.29%	17.03%	11.94%	12.14%
Lagged Stock Return	11.06%	11.46%	15.85%	12.76%
Volatility	0.47	0.45	0.52	0.47
Sales Growth	31.88%	8.01%	22.09%	9.54%
Capex	4.81%	2.61%	4.23%	2.49%
Cash	13.29%	4.47%	16.90%	7.48%
Book Leverage	41.67%	35.03%	18.61%	13.67%
Firm Age	30.74	15	40.79	25

Panel D: The Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Public	1																
2 Ln(Sales)	0.15 [0.00]	1															
3 ROA	0.17 [0.00]	0.50 [0.00]	1														
4 Lagged ROA	0.08 [0.00]	0.47 [0.00]	0.83 [0.00]	1													
5 Stock Return	-0.02 [0.00]	-0.03 [0.00]	0.04 [0.00]	-0.02 [0.00]	1												
6 Lagged Stock Return	0.04 [0.00]	0.01 [0.05]	0.06 [0.00]	0.04 [0.00]	-0.06 [0.00]	1											
7 Volatility	0.08 [0.00]	-0.25 [0.00]	-0.27 [0.00]	-0.32 [0.00]	0.06 [0.00]	0.10 [0.00]	1										
8 Sales Growth	-0.05 [0.00]	-0.17 [0.00]	-0.20 [0.00]	-0.31 [0.00]	0.07 [0.00]	0.09 [0.00]	0.13 [0.00]	1									
9 Capex	-0.04 [0.00]	0.05 [0.00]	-0.02 [0.00]	0.05 [0.00]	0.00 [0.00]	0.05 [0.00]	0.05 [0.00]	0.12 [0.00]	1								
10 Cash	0.06 [0.00]	-0.33 [0.00]	-0.34 [0.00]	-0.37 [0.00]	0.03 [0.00]	0.05 [0.00]	0.41 [0.00]	0.17 [0.00]	-0.09 [0.00]	1							
11 Book Leverage	-0.33 [0.00]	0.08 [0.00]	-0.11 [0.00]	-0.04 [0.00]	-0.05 [0.00]	-0.07 [0.00]	-0.07 [0.00]	-0.02 [0.00]	0.12 [0.00]	-0.28 [0.00]	1						
12 Ln(Firm Age)	0.21 [0.00]	0.36 [0.00]	0.29 [0.00]	0.27 [0.00]	-0.05 [0.00]	-0.02 [0.00]	-0.34 [0.00]	-0.24 [0.00]	-0.11 [0.00]	-0.29 [0.00]	-0.04 [0.00]	1					
13 MBA	0.02 [0.00]	0.08 [0.00]	0.00 [0.61]	-0.01 [0.21]	0.00 [0.49]	0.00 [0.32]	0.04 [0.00]	0.01 [0.09]	0.00 [0.31]	0.06 [0.00]	-0.01 [0.01]	0.00 [0.41]	1				
14 Male	0.04 [0.00]	0.03 [0.00]	0.01 [0.00]	0.01 [0.00]	0.02 [0.00]	0.01 [0.14]	0.00 [0.88]	0.00 [0.82]	0.01 [0.09]	-0.04 [0.00]	0.03 [0.00]	0.01 [0.06]	0.01 [0.07]	1			
15 Founder	0.03 [0.00]	-0.12 [0.00]	-0.09 [0.00]	-0.09 [0.00]	0.02 [0.00]	0.03 [0.00]	0.20 [0.00]	0.08 [0.00]	0.04 [0.00]	0.19 [0.00]	-0.06 [0.00]	-0.20 [0.00]	-0.04 [0.00]	0.02 [0.00]	1		
16 Chairman	0.11 [0.00]	0.15 [0.00]	0.07 [0.00]	0.07 [0.00]	0.03 [0.00]	0.02 [0.00]	-0.01 [0.00]	-0.01 [0.17]	0.04 [0.00]	-0.06 [0.00]	0.00 [0.75]	0.08 [0.00]	0.00 [0.61]	0.06 [0.00]	0.17 [0.00]	1	
17 Ln(CEO Age)	0.08 [0.00]	0.11 [0.00]	0.12 [0.00]	0.12 [0.00]	-0.05 [0.00]	-0.03 [0.00]	-0.21 [0.00]	-0.12 [0.00]	-0.04 [0.00]	-0.13 [0.00]	-0.01 [0.00]	0.26 [0.00]	-0.08 [0.00]	0.05 [0.00]	-0.01 [0.00]	0.21 [0.00]	1

Table 3. Difference in CEO Pay Between Public and Private Firms

The sample consists of 7,767 private firm-year observations and 38,041 public firm-year observations from 1999-2008, obtained from CIQ. For public firms, we calculate the dollar value of each option grant, based on ExecuComp's modified Black-Scholes approach. When private firms in our sample pay their CEOs with restricted stock, we take the value of restricted stock as reported by the firm (*Stock*). With respect to the value of option grants for private firm CEOs, we hand collect relevant information and make the following assumption to compute the value (*Option*): (1) the volatility is the median volatility of public firms in the same industry; (2) the risk-free rate is the seven-year Treasury bond yield prevailing on the grant date; (3) the grant-date stock price is the exercise price (the option is granted at-the-money); (4) the dividend yield is zero; and (5) the time to maturity is 70% of the stated maturity. Total pay (*Totalpay*) is the sum of the CEO's salary, bonus, the grant-date value of restricted stock awards (*Stock*), and the Black-Scholes value of granted options (*Option*), and other pay. Cash pay is the sum of salary and bonus. Public takes the value of one if the firm is a public firm, and zero otherwise. MBA, Male, Founder, and Chairman take the value of one if the CEO holds an MBA degree, is a male, is one of the firm's founders, and is Chairman of the Board, respectively, and zero otherwise. To measure stock performance, we use firm-specific stock return for public firms, and the return of value-weighted industry portfolio for private firms. Volatility for public firms is the annualized standard deviation of firm-specific returns over the last 60 months. Volatility for private firms is the median volatility of public firms in the same industry. Capex, Cash, and Book Leverage are all normalized by book value of total assets. All dollar values are in 2008 dollars. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects (FE) are included in the regressions and the heteroskedasticity-consistent standard errors account for possible correlation within a firm cluster. Superscripts ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively. P-values are reported in brackets.

	Ln(Total Pay)				Ln(Cash Pay)	
	(1)	(2)	(3)	(4)	(5)	(6)
Public	0.342*** [0.000]	0.233*** [0.000]	0.217*** [0.000]	0.170*** [0.000]	0.102*** [0.000]	0.089*** [0.000]
Ln(Sales)	0.217*** [0.000]	0.479*** [0.000]	0.470*** [0.000]	0.180*** [0.000]	0.332*** [0.000]	0.327*** [0.000]
ROA		-0.667*** [0.000]	-0.673*** [0.000]		-0.248*** [0.000]	-0.260*** [0.000]
Lagged ROA		-0.249*** [0.001]	-0.209*** [0.005]		-0.428*** [0.000]	-0.409*** [0.000]
Stock Return		0.130*** [0.000]	0.131*** [0.000]		0.112*** [0.000]	0.113*** [0.000]
Lagged Stock Return		0.177*** [0.000]	0.177*** [0.000]		0.109*** [0.000]	0.108*** [0.000]
Volatility		-0.106** [0.023]	-0.088* [0.056]		-0.223*** [0.000]	-0.180*** [0.001]
Sales Growth		-0.005 [0.695]	-0.004 [0.764]		-0.024** [0.041]	-0.021* [0.074]
Capex		0.317* [0.064]	0.334* [0.050]		0.020 [0.904]	0.050 [0.761]
Cash		1.011*** [0.000]	1.031*** [0.000]		0.478*** [0.000]	0.514*** [0.000]
Book Leverage		0.098**	0.094**		0.175***	0.174***

		[0.012]	[0.016]		[0.000]	[0.000]
Ln(Firm Age)		0.025**	0.019*		0.050***	0.038***
		[0.010]	[0.055]		[0.000]	[0.000]
MBA			0.109***			0.047**
			[0.000]			[0.016]
Male			0.052			0.021
			[0.291]			[0.569]
Founder			-0.120***			-0.135***
			[0.000]			[0.004]
Chairman			0.180***			0.132***
			[0.000]			[0.000]
Ln(CEO Age)			-0.013			0.268***
			[0.837]			[0.000]
Constant	9.673***	4.269***	4.356***	9.783***	6.604***	5.577***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Industry and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	45808	39269	38896	45808	39269	38896
Adj R2	38%	55%	56%	31%	41%	42%

Table 4. Difference in CEO Pay Between Public and Private Firms, 2008 Subsample with CEO Ownership

This 2008 subsample consists of 508 private firms and 1302 public firms with CEO ownership available in 2008. For public firms, we calculate the dollar value of each option grant, based on ExecuComp’s modified Black-Scholes approach. For private firms, we hand collect the ownership data from the firm’s 10-K filings and proxy statements. For public firms, we collect the ownership data from ExecuComp. Stock ownership is the number of the firm’s shares owned by the CEO normalized by total shares outstanding. Option ownership is defined as $0.6 \times (\text{total option shares owned by the CEO}) / \text{total shares outstanding}$, assuming that the average option delta is 0.6. When private firms in our sample pay their CEOs with restricted stock, we take the value of restricted stock as reported by the firm (*Stock*). With respect to the value of option grants for private firm CEOs, we hand collect relevant information and make the following assumption to compute the value (*Option*): (1) the volatility is the median volatility of public firms in the same industry; (2) the risk-free rate is the seven-year Treasury bond yield prevailing on the grant date; (3) the grant-date stock price is the exercise price (the option is granted at-the-money); (4) the dividend yield is zero; and (5) the time to maturity is 70% of the stated maturity. Total pay (*Totalpay*) is the sum of the CEO’s salary, bonus, the grant-date value of restricted stock awards (*Stock*), and the Black-Scholes value of granted options (*Option*), and other pay. Cash pay is the sum of salary and bonus. Public takes the value of one if the firm is a public firm, and zero otherwise. MBA, Male, Founder, and Chairman take the value of one if the CEO holds an MBA degree, is a male, is one of the firm’s founders, and is Chairman of the Board, respectively, and zero otherwise. To measure stock performance, we use firm-specific stock return for public firms, and the return of value-weighted industry portfolio for private firms. Volatility for public firms is the annualized standard deviation of firm-specific returns over the last 60 months. Volatility for private firms is the median volatility of public firms in the same industry. Capex, Cash, and Book Leverage are all normalized by book value of total assets. All dollar values are in 2008 dollars. All continuous variables are winsorized at the 1st and 99th percentiles. Industry fixed effects (FE) are included in the regressions. Superscripts ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively. P-values are reported in brackets. Panel A presents the descriptive statistics of CEO ownership. The mean ownership is reported first, the median ownership is given in parentheses, and the sample size is given in brackets. Panel B presents the regression analysis.

Panel A: Summary Statistics on CEO Ownership

	Founder	Non-founder	Both Founder and Non-founder
Private Firm CEO Stock Ownership	36.19% (25.79%) [70]	19.59% (2.51%) [438]	21.88% (3.45%) [508]
Public Firm CEO Stock Ownership	5.66% (1.51%) [112]	1.61% (0.29%) [1190]	1.95% (0.33%) [1302]
Public Firm CEO Stock and Option Ownership	6.54% (3.34%) [112]	2.20% (0.85%) [1190]	2.57% (0.93%) [1302]

Panel B: Regression Analysis

	Ln(Total Pay)			Ln(Cash Pay)		
	(1)	(2)	(3)	(4)	(5)	(6)
Public	0.914*** [0.000]	0.649*** [0.000]	0.619*** [0.000]	0.490*** [0.000]	0.386*** [0.000]	0.372*** [0.000]
Stock Ownership	-0.859*** [0.000]	-0.372* [0.059]	-0.381* [0.058]	-0.981*** [0.000]	-0.177 [0.480]	-0.086 [0.735]
Ln(Sales)	0.171*** [0.000]	0.371*** [0.000]	0.362*** [0.000]	0.143*** [0.000]	0.216*** [0.000]	0.209*** [0.000]
ROA		-0.078 [0.825]	0.019 [0.956]		1.005** [0.027]	1.096** [0.015]
Lagged ROA		-0.700 [0.151]	-0.762 [0.118]		-1.525** [0.014]	-1.695*** [0.006]
Stock Return		0.108* [0.091]	0.106* [0.098]		0.086 [0.292]	0.100 [0.223]
Lagged Stock Return		0.320*** [0.000]	0.316*** [0.000]		0.311*** [0.002]	0.301*** [0.002]
Volatility		-0.323 [0.130]	-0.311 [0.148]		-0.720*** [0.009]	-0.565** [0.039]
Sales Growth		0.056* [0.057]	0.043 [0.144]		0.086** [0.021]	0.040 [0.284]
Capex		0.962* [0.051]	0.961* [0.051]		0.395 [0.530]	0.581 [0.353]
Cash		0.172 [0.326]	0.213 [0.224]		-0.515** [0.021]	-0.389* [0.081]
Book Leverage		-0.129* [0.084]	-0.163** [0.029]		-0.086 [0.402]	-0.109 [0.286]
Ln(Firm Age)		0.261*** [0.007]	0.245** [0.012]		0.326*** [0.008]	0.272** [0.027]
MBA			0.122** [0.027]			0.100 [0.155]
Male			-0.087 [0.514]			-0.072 [0.669]
Founder			-0.162* [0.056]			-0.632*** [0.000]
Chairman			0.196*** [0.000]			0.207*** [0.001]
Ln(CEO Age)			-0.222 [0.230]			0.366 [0.122]
Constant	10.541*** [0.000]	6.345*** [0.000]	7.403*** [0.000]	10.796*** [0.000]	9.122*** [0.000]	7.871*** [0.000]

Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1810	1558	1550	1810	1558	1550
Adj R2	58%	53%	54%	41%	28%	30%

Table 5. Difference in Pay Structure Between Public and Private Firms

The sample consists of 7,767 private firm-year observations and 38,041 public firm-year observations from 1999-2008, obtained from CIQ. For public firms, we calculate the dollar value of each option grant, based on ExecuComp's modified Black-Scholes approach. When private firms in our sample pay their CEOs with restricted stock, we take the value of restricted stock as reported by the firm (*Stock*). With respect to the value of option grants for private firm CEOs, we hand collect relevant information and make the following assumption to compute the value (*Option*): (1) the volatility is the median volatility of public firms in the same industry; (2) the risk-free rate is the seven-year Treasury bond yield prevailing on the grant date; (3) the grant-date stock price is the exercise price (the option is granted at-the-money); (4) the dividend yield is zero; and (5) the time to maturity is 70% of the stated maturity. Total pay (*Totalpay*) is the sum of the CEO's salary, bonus, the grant-date value of restricted stock awards (*Stock*), and the Black-Scholes value of granted options (*Option*), and other pay. Cash pay is the sum of salary and bonus. Equity-based pay is the sum of value of restricted stock awards and value of granted options. Public takes the value of one if the firm is a public firm, and zero otherwise. MBA, Male, Founder, and Chairman take the value of one if the CEO holds an MBA degree, is a male, is one of the firm's founders, and is Chairman of the Board, respectively, and zero otherwise. To measure stock performance, we use firm-specific stock return for public firms, and the return of value-weighted industry portfolio for private firms. Volatility for public firms is the annualized standard deviation of firm-specific returns over the last 60 months. Volatility for private firms is the median volatility of public firms in the same industry. Capex, Cash, and Book Leverage are all normalized by book value of total assets. Columns (1)-(3) present the regression results when the dependent variable is the ratio of cash pay to total pay. Columns (4)-(6) present the regression results when the dependent variable is the ratio of equity-based pay to total pay. All dollar values are in 2008 dollars. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included in the regressions and the heteroskedasticity-consistent standard errors account for possible correlation within a firm cluster. Superscripts ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively. P-values are reported in brackets.

	Cash Pay/Total Pay			Equity-based Pay/Total Pay		
	(1)	(2)	(3)	(4)	(5)	(6)
Public	-0.080*** [0.000]	-0.078*** [0.000]	-0.077*** [0.000]	0.117*** [0.000]	0.108*** [0.000]	0.109*** [0.000]
Ln(Sales)	-0.045*** [0.000]	-0.063*** [0.000]	-0.061*** [0.000]	0.042*** [0.000]	0.059*** [0.000]	0.057*** [0.000]
ROA		0.183*** [0.000]	0.182*** [0.000]		-0.167*** [0.000]	-0.164*** [0.000]
Lagged ROA		-0.024 [0.303]	-0.032 [0.167]		0.034* [0.089]	0.045** [0.027]
Stock Return		-0.004 [0.298]	-0.004 [0.294]		0.005 [0.107]	0.005 [0.133]
Lagged Stock Return		-0.020*** [0.000]	-0.020*** [0.000]		0.022*** [0.000]	0.022*** [0.000]
Volatility		-0.013 [0.331]	-0.010 [0.435]		0.014 [0.256]	0.002 [0.848]
Sales Growth		-0.002 [0.437]	-0.002 [0.462]		0.002 [0.434]	0.001 [0.637]
Capex		-0.159*** [0.001]	-0.162*** [0.000]		0.214*** [0.000]	0.209*** [0.000]
Cash		-0.184*** [0.000]	-0.184*** [0.000]		0.206*** [0.000]	0.201*** [0.000]

Book Leverage		0.034***	0.037***		-0.048***	-0.050***
		[0.001]	[0.000]		[0.000]	[0.000]
Ln(Firm Age)		0.003	0.003		-0.006**	-0.004
		[0.272]	[0.239]		[0.019]	[0.107]
MBA			-0.031***			0.034***
			[0.000]			[0.000]
Male			-0.008			-0.002
			[0.587]			[0.905]
Founder			0.032***			-0.029***
			[0.000]			[0.000]
Chairman			-0.030***			0.023***
			[0.000]			[0.000]
Ln(CEO Age)			0.067***			-0.152***
			[0.000]			[0.000]
Constant	1.523***	1.909***	1.624***	-0.621***	-0.952***	-0.314***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Industry and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	45808	39269	38896	45808	39269	38896
Adj R2	17%	21%	21%	20%	22%	23%

Table 6. Difference in Pay-Performance Sensitivity Between Public and Private Firms

The sample consists of 7,767 private firm-year observations and 38,041 public firm-year observations from 1999-2008, obtained from CIQ. For public firms, we calculate the dollar value of each option grant, based on ExecuComp's modified Black-Scholes approach. When private firms in our sample pay their CEOs with restricted stock, we take the value of restricted stock as reported by the firm (*Stock*). With respect to the value of option grants for private firm CEOs, we hand collect relevant information and make the following assumption to compute the value (*Option*): (1) the volatility is the median volatility of public firms in the same industry; (2) the risk-free rate is the seven-year Treasury bond yield prevailing on the grant date; (3) the grant-date stock price is the exercise price (the option is granted at-the-money); (4) the dividend yield is zero; and (5) the time to maturity is 70% of the stated maturity. Total pay (*Totalpay*) is the sum of the CEO's salary, bonus, the grant-date value of restricted stock awards (*Stock*), and the Black-Scholes value of granted options (*Option*), and other pay. MBA, Male, Founder, and Chairman take the value of one if the CEO holds an MBA degree, is a male, is one of the firm's founders, and is Chairman of the Board, respectively, and zero otherwise. To measure stock performance, we use firm-specific stock return for public firms, and the return of value-weighted industry portfolio for private firms. Volatility for public firms is the annualized standard deviation of firm-specific returns over the last 60 months. Volatility for private firms is the median volatility of public firms in the same industry. Capex, Cash, and Book Leverage are all normalized by book value of total assets. The dependent variable is Ln(*Totalpay*). Columns (1) and (2) present the full sample results. Column (3) employs only the private firm sample. Column (4) employs only the public firm sample. All dollar values are in 2008 dollars. All continuous variables are winsorized at the 1st and 99th percentiles. Firm and year fixed effects are included in the regressions and the heteroskedasticity-consistent standard errors account for possible correlation within a firm cluster. Superscripts ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively. P-values are reported in brackets.

	Full Sample		Private Firms	Public Firms
	(1)	(2)	(3)	(4)
Public	0.076** [0.05]	0.067* [0.08]		
Ln(Sales)	0.193*** [0.000]	0.195*** [0.000]	0.205*** [0.000]	0.194*** [0.000]
ROA	-0.183 [0.120]	-0.200* [0.090]	-0.026 [0.871]	0.272*** [0.000]
Lagged ROA	-0.038 [0.768]	0.026 [0.841]	0.262* [0.081]	0.272*** [0.000]
Stock Return	0.094*** [0.006]	0.096*** [0.005]	0.031 [0.472]	0.131*** [0.000]
Lagged Stock Return	0.005 [0.918]	0.007 [0.885]	0.035 [0.489]	0.140*** [0.000]
Public × ROA	0.607*** [0.000]	0.611*** [0.000]		
Public × Lagged ROA	0.335** [0.025]	0.281* [0.063]		
Public × Stock Return	0.031 [0.369]	0.030 [0.373]		
Public × Lagged Stock Return	0.130*** [0.009]	0.129*** [0.009]		
Volatility	-0.012	0.005	-0.125	-0.003

	[0.730]	[0.895]	[0.643]	[0.939]
Sales Growth	-0.004	-0.001	0.022	-0.001
	[0.535]	[0.884]	[0.259]	[0.940]
Capex	0.824***	0.832***	-0.021	0.968***
	[0.000]	[0.000]	[0.946]	[0.000]
Cash	0.215***	0.201***	0.240	0.214***
	[0.000]	[0.000]	[0.164]	[0.000]
Book Leverage	-0.171***	-0.163***	-0.278***	-0.164***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln(Firm Age)	0.182***	0.168***	0.002	0.195***
	[0.000]	[0.000]	[0.978]	[0.000]
MBA		-0.002	-0.095	0.007
		[0.908]	[0.128]	[0.727]
Male		0.132***	-0.201	0.169***
		[0.006]	[0.114]	[0.001]
Founder		-0.151***	0.065	-0.161***
		[0.000]	[0.583]	[0.000]
Chairman		0.075***	0.243***	0.065***
		[0.000]	[0.000]	[0.001]
Ln(CEO Age)		0.056	-0.259	0.084
		[0.284]	[0.151]	[0.123]
Constant	9.642***	9.278***	11.032***	9.153***
	[0.000]	[0.000]	[0.000]	[0.000]
Firm and Year FE	Yes	Yes	Yes	Yes
Observations	39269	38896	4562	34334
Adj R2	42%	43%	48%	40%

Table 7. Pay Change in Private Firms versus Pay Change in Public Firms

The dependent variable is the change in total pay (ΔPay) for our sample of private firms, where ΔPay is defined as $Ln(Totalpay)_t - Ln(Totalpay)_{t-1}$. Total pay ($Totalpay$) is the sum of the CEO's salary, bonus, the grant-date value of restricted stock awards, and the Black-Scholes value of granted options, and other pay. For each private firm-year observation, we compute the mean and median ΔPay for the public firms in the same industry in that year (*Mean Public ΔPay* and *Median Public ΔPay* , respectively). The variable $\Delta Sale$ is the change in sales, defined as $Ln(Sales)_t - Ln(Sale)_{t-1}$. To measure stock performance, we use firm-specific stock return for public firms, and the return of value-weighted industry portfolio for private firms. All dollar values are in 2008 dollars. All continuous variables are winsorized at the 1st and 99th percentiles. Industry and year fixed effects are included in the regressions and the heteroskedasticity-consistent standard errors account for possible correlation within a firm cluster. Superscripts ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively. P-values are reported in brackets.

	(1)	(2)	(3)	(4)
Mean Public ΔPay	0.091 [0.365]	0.123 [0.238]		
Median Public ΔPay			0.180 [0.323]	0.140 [0.436]
$\Delta Ln(Sales)$	0.181*** [0.000]	0.144*** [0.000]	0.181*** [0.000]	0.145*** [0.000]
ROA		0.050 [0.413]		0.050 [0.412]
Lagged ROA		-0.106 [0.215]		-0.105 [0.215]
Stock Return		0.060 [0.227]		0.063 [0.208]
Lagged Stock Return		0.007 [0.910]		0.011 [0.868]
Constant	0.011 [0.911]	-0.170 [0.183]	0.012 [0.903]	-0.169 [0.187]
Industry and Year FE	Yes	Yes	Yes	Yes
Observations	4576	3947	4576	3947
Adj R2	2.9%	2.8%	3%	2.8%

Figure 1. CEO Pay and Firm Size Over Time

The sample consists of 7,767 private firm-year observations and 38,041 public firm-year observations from 1999-2008, obtained from CIQ. Total pay (*Totalpay*) is the sum of the CEO's salary, bonus, the grant-date value of restricted stock awards (*Stock*), and the Black-Scholes value of granted options (*Option*), and other pay. Firm size is captured by sales. This figure presents the plots of sample mean CEO total pay (in thousands of dollars) and firm size (in millions of dollars) across the public and private firm samples over time.

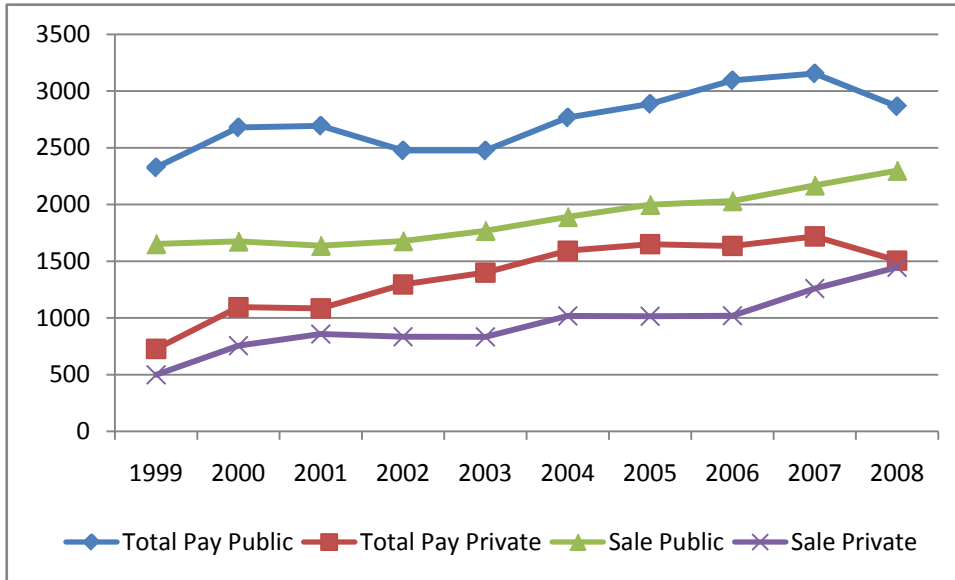


Figure 2. Public Firm CEO Pay Premium

The sample consists of 7,767 private firm-year observations and 38,041 public firm-year observations from 1999-2008, obtained from CIQ. For each year, we run a cross-sectional regression and obtain the coefficient on the public firm indicator variable. For example, suppose the coefficient on public is 0.5, then the public firm CEO pay premium is computed as $e^{0.5} - 1 = 64.8\%$ for that year. We plot yearly regression coefficients on the public firm indicator variable using the regression model of Column (3) in Table 3, which involves the public firm indicator variable, firm and CEO characteristics, and industry fixed effects.

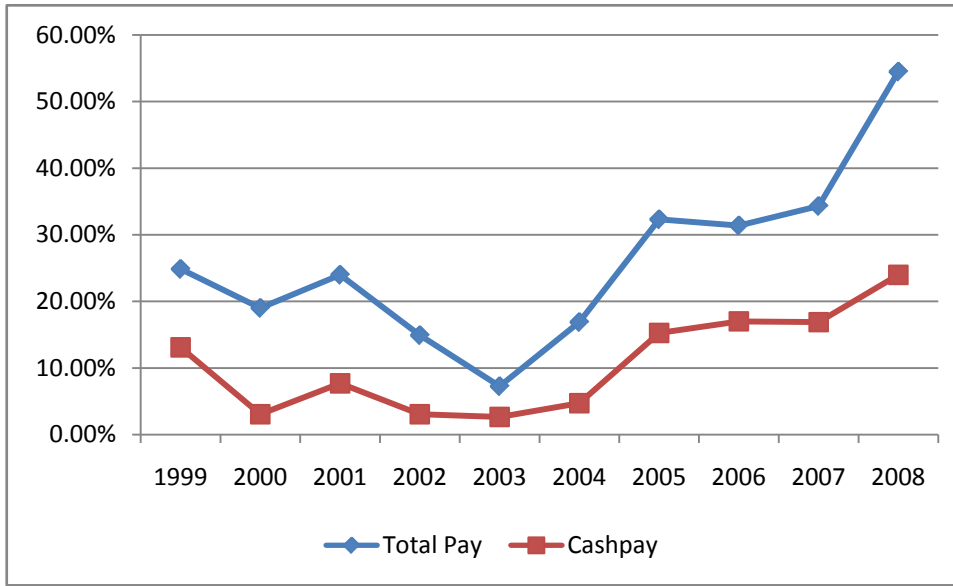
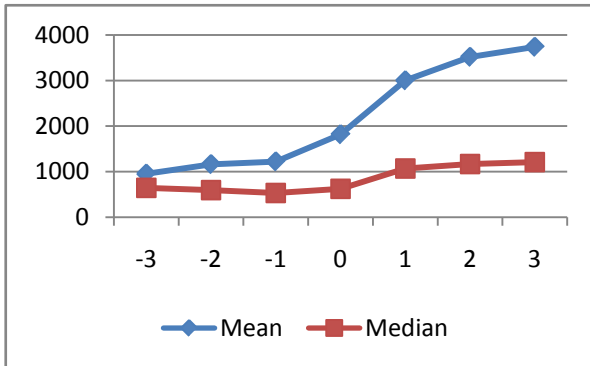


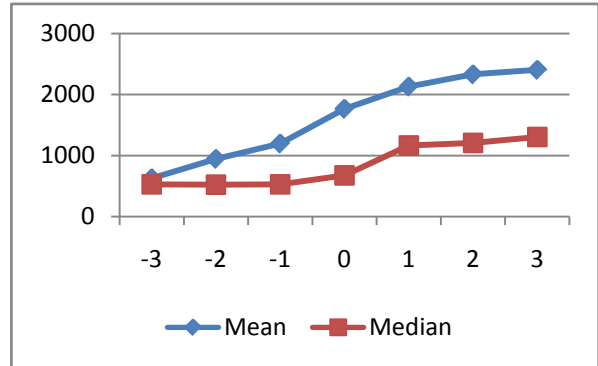
Figure 3. Change in CEO Pay Around IPO

The sample consists of 574 IPO deals where 282 of them have the same CEO from one year before the IPO to one year after the IPO. We plot the time series of CEO pay centered around the year of IPO, which is year 0 in the plot. Total pay (*Totalpay*) is the sum of the CEO's salary, bonus, the grant-date value of restricted stock awards (*Stock*), and the Black-Scholes value of granted options (*Option*), and other pay. Cash pay is the sum of salary and bonus. Panels A, C, and E are based on all the 574 IPO deals and Panels B, D, and F are based on the 282 IPO deals that have the same CEO during years [-1, +1] around the IPO.

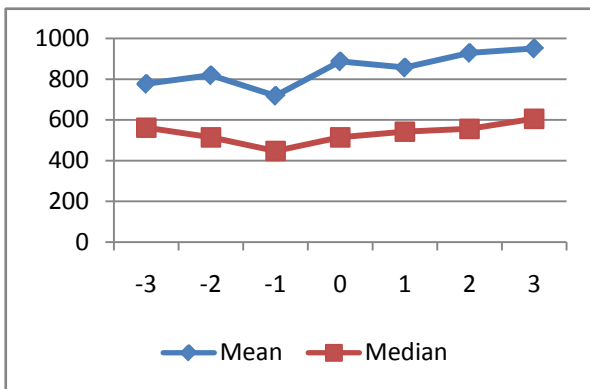
Panel A: Total Pay



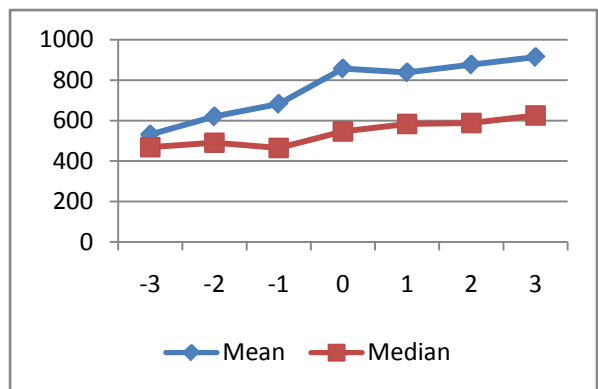
Panel B: Total Pay, Same CEO during [-1 Year, +1 Year]



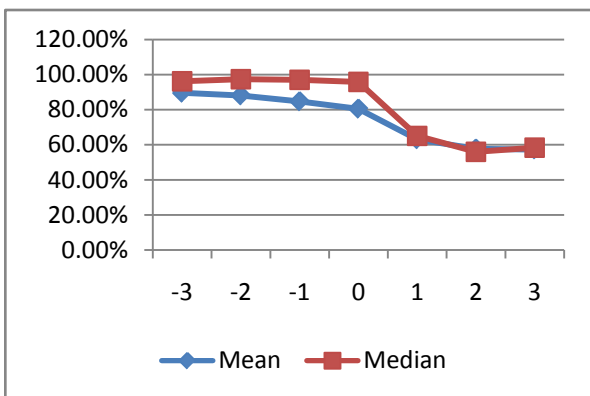
Panel C: Cash Pay



Panel D: Cash Pay, Same CEO during [-1 Year, +1 Year]



Panel E: Cash Pay/Total Pay



Panel F: Cash Pay/Total Pay, Same CEO during [-1 Year, +1 Year]

