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in 2006**

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CEO Compensation for Major US Companies in 2006*

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Abstract

The purpose of this paper is to update the empirical investigation into the pay-setting practices of major U.S. companies. While it enters the debate on the determinants of CEO compensation, our approach is explanatory rather than prescriptive. In our empirical analysis, we use a sample of 236 major U.S. firms from the *2006 WSJ/Mercer CEO Compensation Survey*. We run a series of cross-sectional regressions that consider the effects of performance indicators on total direct compensation and the cash bonus. We also test the effects on non-performance variables, which represent potential agency problems involved with CEO compensation. We find that CEO compensation is tied to firm performance, but whether the link has increased or decreased in strength over time remains unclear. We also determine that non-performance related factors contribute significantly to CEO compensation: CEOs who are also chairmen of the board make 35% more than non-chairmen, and companies that grant more stock options tend to have 30% lower dividend yields.

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1. Introduction

The public perception of CEO pay is shaped by headlines of outrageous salaries and golden parachutes. However, front-page stories are usually the exception rather than the rule, and the media gives few explanations for the level of executive compensation. This begs the question, what are the economic principles behind the determinants of CEO pay? While many authors have analyzed the link between CEO compensation and performance, the recent explosion in CEO pay leaves much of this analysis outdated. In 1999, Kevin Murphy published a comprehensive study of CEO pay based on data from 1996. The purpose of this paper is to update the empirical investigation into the pay-setting practices of major U.S. companies. While this paper sheds some light on the determinants of CEO compensation, our approach will be explanatory rather than prescriptive.

The first section of the paper reviews the literature on CEO pay and performance: how CEO pay is linked to firm performance, the use of dividends and options, the effect of CEO tenure, and the effect of CEO influence over the board of directors.

In the next section we present our data and provide summary statistics of the components of CEO compensation. For our sample, we use 236 major US firms from the *2006 WSJ/Mercer CEO Compensation Survey*. The average total direct compensation of the CEOs in our sample is \$8.8 million, while the median is \$6.7 million. Compensation levels and the weights of the components vary systematically across industries.

Our results are reported in four major sections.

- 1) The relationship between CEO compensation and firm performance.

- 2) The relationship between CEO compensation and non-performance variables of the CEO and firm.
- 3) The relationship between the use of option compensation and the firm's dividend yield.
- 4) The historical trend of the link between CEO compensation and firm performance.

These results show that a 10% increase in shareholder returns yields a roughly 3% increase in total direct compensation, while it increases the cash bonus by nearly 10%. Additionally, we see that CEOs who are also chairmen of the board make 35% more than non-chairmen, and those with larger options grants tend to have lower dividend yields by 30%.

This paper neither justifies nor condemns the level of CEO pay; rather it tries to provide an accurate assessment of the relationship between CEO compensation and various characteristics of the CEO and the firm.

2. Literature Review

There has been a substantial increase in the academic research on executive compensation over the last 20 years. Authors have concentrated on the relationship between measured increases in CEO compensation and firm performance. In this section, we discuss the theories that describe the relationship between executive pay and performance as well as the methods by which they have been tested.

The principal-agent theory provides a model for an optimal contract in which the CEO has incentives to act in the interest of the shareholders. In reality, the actions of a CEO are difficult to observe and quantify: how can shareholders tell how hard a CEO is

really working? Therefore, CEO incentive pay is actually based on indicators of his or her actions. These indicators are in the form of performance metrics of the company. Company performance in any given year is influenced by numerous market and non-systematic risks outside of the CEO's control, so company performance metrics are at best noisy proxies for CEO performance. Based on this simplified model, there are theoretically both explicit and implicit connections between CEO compensation and performance. Equity-based payments are explicit in that the CEO gains directly from stock appreciation. The cash bonus is implicit in that it is based on an evaluation by the compensation committee rather than calculated mechanically (Murphy, 1999).¹

Although the principal agent model predicts an optimal contract to align CEO and shareholder interests, there are theoretical reasons why this may not be feasible. First, because compensation is based on accounting measures of success, the CEO may have an incentive to manipulate the indicators of his or her success in order to boost compensation. Second, to maintain the link between pay and performance, a sufficiently competitive market for executives is needed to replace an over-paid executive with one who would achieve the same performance at lower compensation. The market for CEOs may be so specialized that there is not sufficient competition, or CEOs may be insulated from threats of competition (Bebchuk and Fried, 2005). Such limits on the market for executives would weaken the link between CEO pay and performance.

Another important factor for the sensitivity of pay to performance is directors' independence. A manager who can influence how his or her compensation is determined would violate the principal-agent model. One could suspect a "power-pay" relationship

¹ There can also be an explicit link between firm performance and the bonus. Many companies use formulas based on company performance to calculate the bonus. However, most firms also use personal or "soft" criteria to determine the bonus. Therefore, Murphy categorizes the bonus as an implicit connection.

where CEOs with control over the board will push for high compensation packages for themselves. If such a relationship exists, then one would expect companies with less independent boards to have weaker pay-for-performance links (Bebchuk and Fried, 2005).

So far the implications of the principal-agent and managerial power models are all theoretical. However, we can empirically test the pay-for-performance relationships that these models predict. The literature offers a litany of regression specifications and statistical methods for analyzing the existence and magnitudes of pay-for-performance relationships. We discuss our own regression specifications later in this paper, but in this section we outline the general form that is used to identify the relationship between pay and performance. This basic form, specified in Murphy (1999), regresses CEO compensation for individual CEOs in distinct years on firm-specific fixed effects and performance-indicator variables.² Typical firm fixed effects would be market capitalization or sales to control for size, while performance variables may be revenue growth or shareholder return (Bebchuk and Grinstein, 2005) (Murphy, 1999). Bebchuk and Grinstein (2005) also regresses changes in CEO compensation on cumulative changes in compensation for the next five executives in each firm on the basis that compensation for the top executives move together.

Additionally, Murphy (1999) differentiates between measuring the explicit link and measuring the implicit link between CEO pay and performance; regressions of equity compensation on firm performance measure the explicit link while regressions of bonus on firm performance measure the implicit link. Even if compensation incentives perfectly

² Murphy estimates the regression $\Delta(\text{CEO Pay})_{it} = a + b\Delta(\text{Performance})_{it}$ for every i^{th} ceo [CEO (all caps)] and t year.

align pay with performance, the explicit link may be difficult to measure. Because a firm's CEO compensation practice is public information, the efficient market hypothesis would suggest the share price already reflects it. Therefore, further regressions of equity compensation on shareholder returns will not pick up a relationship. This may result in an underestimation of the relationship between total compensation and firm performance, since total compensation includes the explicit link.

Finally, Murphy (1999) discusses the use of "relative performance evaluation," in which the natural log of CEO pay is regressed on firm-specific effects, firm performance, as well as broad market and industry-specific effects. These regressions examine the hypothesis that companies account for market and industry movements when determining compensation. He finds that market and industry effects are taken into account when determining the bonus, but equity compensation is not indexed to account for these effects.

These empirical analyses of pay and performance are based on assumptions made in the principal-agent model. However, many authors suggest current compensation practices have unresolved agency problems. For example, CEOs with greater influence over the board of directors may be able to command more compensation. Core, Holthausen, and Larcker (1999) found that the following characteristics are correlated with higher CEO compensation:

- 1) The CEO is also chairman of the board.
- 2) The board is larger.
- 3) Outside directors are appointed by the CEO, are older, or serve on 3 or more boards.

In addition, Finkelstein and Hambrick (1989) found that a CEO with more influence over the board of directors is able to use that influence to circumvent the board's monitoring mechanisms. This evidence would seem to suggest that the principal-agent model is not the dominant model when determining CEO compensation.

A brief look at the components of CEO compensation over time will reveal that a large part of the increase in CEO pay since the 1980's has been accounted for by the increase in grant-day valued options (Bebchuck and Grinstein, 2005). Ostensibly, this is to align CEO incentives with shareholder interests. However, CEOs holding stock options could also be motivated to act in their own interest by not raising dividend payments. Lambert, Lanen, and Larcker (1989) examine the initial adoption of stock option plans and subsequent dividend payments. They find that after compensating executives with options, dividends for a company are reduced relative to expected dividends. Along the same lines, Jolls (1998) finds that companies with more executive stock options are more likely to favor share repurchases and have a lower dividend yield. MacMinn and Page (2005) find that when an executive is compensated with options, he or she will prefer financing the company with debt rather than diluting equity. Options connect pay with performance by rewarding executives for nominal stock price increases. That being said, nominal stock price increases may not always be in the interest of the shareholders.

Based on this survey of the literature, we use new data from 2006 to address the questions:

- 1) How much is CEO total compensation tied to firm performance?
- 2) How much is CEO cash compensation tied to firm performance?

- 3) Are CEOs who are also the chairman of the board paid more?
- 4) Are longer tenured CEOs paid more?
- 5) Are CEOs with more option grants less inclined to raise dividends?

3. Data Description and Summary

3.1 Data Description

The companies in our study were from the *2006 Wall Street Journal/Mercer CEO Compensation Survey* (Lublin R1). The 350 companies in the survey are major publicly traded industrial and service firms with revenues exceeding US\$1 billion that have filed their latest proxy statements by April 3, 2007. In practice, this survey includes most of the largest US firms across the major industrial categories.³ It is important to note that our sample is not a random sample of all US corporations, or even a random sample of large US corporations, but rather the sample was hand picked by the *Wall Street Journal* to be representative of the major industrial categories. One should not generalize the results presented in this paper out of context. The *WSJ/Mercer* survey details the major components of CEO pay such as salary, bonus, options, and equity. These major components along with several minor components make up “total direct compensation.” Unlike executive compensation as reported in the company proxy statement, the *WSJ/Mercer* survey defines total direct compensation as compensation that was granted during the 2006 fiscal year, excluding vested compensation granted from previous years but including compensation granted in 2006 which will vest in future years.

The SEC changed its executive compensation disclosure rules in 2006.

Companies that filed their proxies on or after December 15, 2006 are required to disclose additional information on executive pay. Some of the new disclosures include the change

³ The industries include Basic Materials, Industrials, Consumer Goods, Consumer Services, Technology, Financial, Utilities, and Health Care and Telecommunications.

in pension value, nonqualified deferred compensation earnings,⁴ and miscellaneous benefits. For all the companies that reported under the new rules, the average value of all the newly disclosed compensation is \$1.6 million, about 15% of overall compensation. However, over 100 firms in our sample did not report these categories because they filed before December 15, 2006. We could not reliably assess that a company's filing date is independent of endogenous variables used in our analysis, such as the industry which the company belongs, so we chose to use "total direct compensation" as the measure of CEO pay. We were unfortunately not able to take advantage of the new SEC disclosure rules the first year because not all companies had implemented them.

The frequency of CEO turnover also adds complexity to our analysis. A significant number of CEOs in the survey started during 2006 or 2005. We hypothesize a CEO's current year compensation is determined by the company's previous year performance. Because we are interested in how CEOs pay is influenced by how the company performs under him or her, CEOs with tenures of less than two years were dropped from the sample. Furthermore, a few CEOs who were with the company when the survey was taken (April 2007) were no longer with the company when our research began (June 2007). Companies with these CEOs were also excluded.⁵

Eight companies in the survey have market capitalizations under \$1 billion. One company, Solutia is in bankruptcy. Another, Applera, is a small bio-tech firm. The remaining six are either homebuilders or grocery chains.⁶ The market capitalizations of homebuilders have severely declined as a result of the sub-prime mortgage crisis. To the

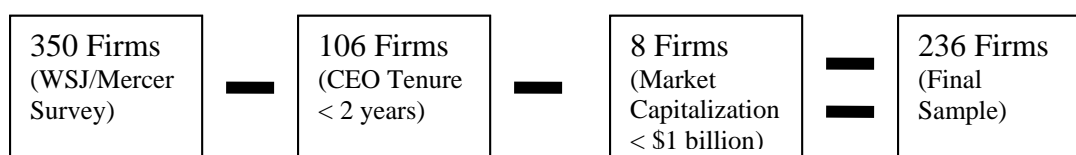
⁴ Nonqualified deferred compensation (NQDC) is a form of retirement benefit. For a full description of NQDC see the IRS website: <http://www.irs.gov/businesses/corporations/article/0,,id=134878,00.html>

⁵ 106 firms were excluded for these reasons.

⁶ These companies are Fleetwood Enterprises, Hovnanian Enterprises, Ingles Markets, Pantry, Beazer Homes USA, and Champion Enterprises.

extent that we are interested in “normal” large US corporations, we decided to exclude the eight companies with market capitalizations under \$1 billion. In addition, several companies have since been acquired or taken private.

In the end we were left with a sample of 236 companies and 237 CEOs because Ralcorp Holdings has co-CEOs. This is 67%, or about two-thirds, of the companies in the original survey. The diagram below summarizes our sample selection process.



It is plausible, and even probable, that poorly performing companies are more likely to have recently changed CEOs. Thus, our sample method may have a “survivorship bias” of systematically excluding poorly performing companies. If better-performing companies have compensation structures that are more responsive to company performance, then our sample will overestimate the responsiveness of compensation to company performance. However, the hypothesis that changing CEO incentives causes changes in company performance has not been empirically tested.

In addition to the compensation data for each CEO, we added personal data on the CEO including whether he or she is chairman of the board, whether he or she was hired from outside of the company, his or her age, and his or her tenure with the company as CEO. We defined an outside hire as one whose first position with his or her current company is CEO. For example, if someone was hired as chief financial officer, and then promoted to CEO, he or she would not be considered an outside hire. Financial data on

the firms such as market capitalization, number of employees, total revenue of the company in 2006, and the shareholder's return in the previous year (2005) were also included. The data were collected from Google Finance, Reuters, and the companies' proxy statements.

3.2 Data Summary

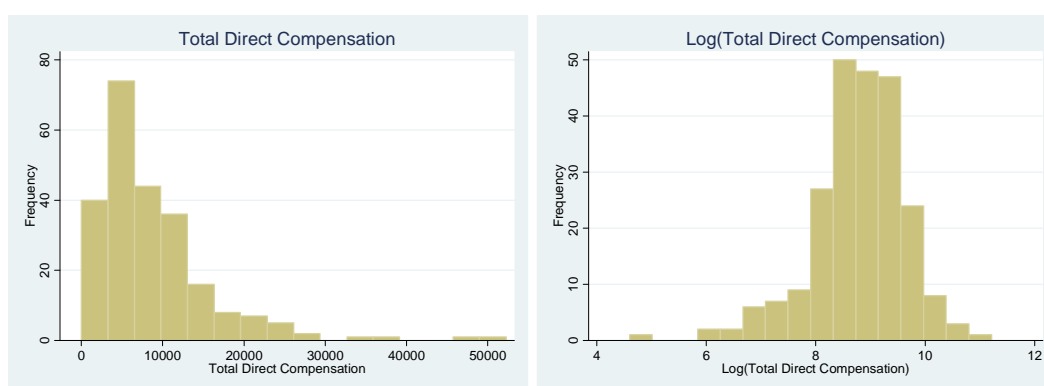
Table 1. Summary Statistics

Dependent Variables	Mean	Median	Std. Dev	Min	Max
Total Direct Compensation (Thousands)	8,755	6,703	7,232	0	48,986
Bonus (Thousands)	2,369	1,689	2,964	0	21,175
Dividend Yield (Percent of Share Price)	1.72	1.49	1.36	0	5.32

Independent Variables					
Market Cap (Billions)	28.9	12.1	49.9	1.18	406.4
Employees	41,767	22,039	59,354	766	428,000
Total Revenue 2006 (Billions)	15,328	7,397	25,378	358	210,118
Total Shareholder Returns 2005 (Percent)	12.98	6.98	34.07	-51.7	363
CEO Chair (Binary)	0.81	1		0	1
CEO Outside (Binary)	0.21	0		0	1
CEO Tenure (Years)	8.2	6	6.1	3	37
CEO Age (Years)	57	57	6.1	41	76
Options (Thousands)	2,076	1,386	3,111	0	31,097

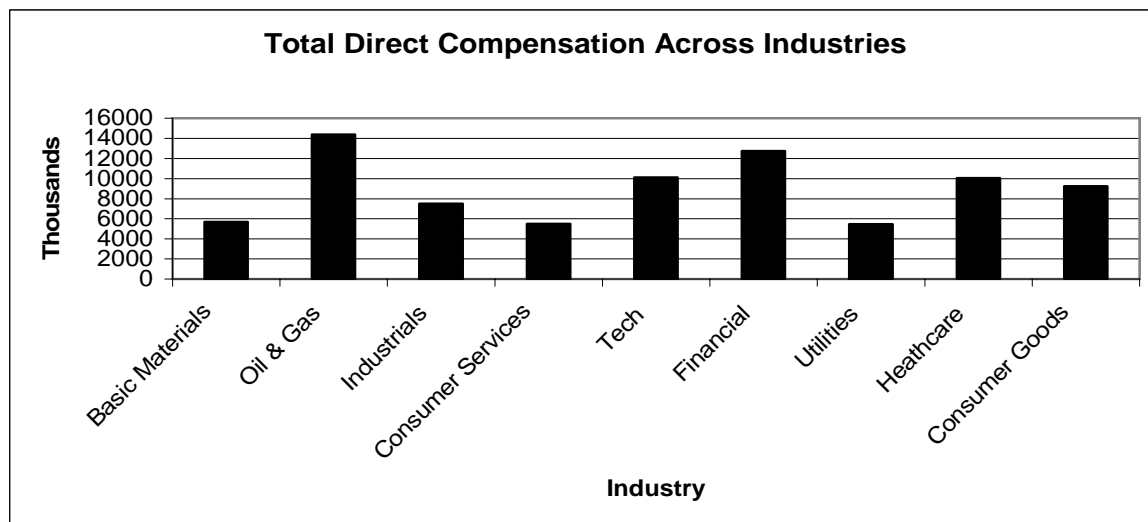
A first look at the data shows that the average total direct compensation for the CEOs in our sample is \$8.8 million, while the median is \$6.7 million. Many of the variables in our data are skewed rightward, so we usually express these variables in the logarithmic form for a more normal distribution and better regression fit. For example, Chart 1 compares frequency distributions of Total Direct Compensation and Log (Total Direct Compensation).

Chart 1: Total Direct Compensation and Log (Total Direct Compensation)



The WSJ/Mercer survey grouped companies by industry, and the average compensation differs widely across industries. For example, the average Oil & Gas CEO earns over \$14 million dollars while the average Utility CEO earns under \$6 million (Chart 2).

Chart 2: Total Direct Compensation by Industry



The average bonus received by the CEOs in our sample is \$2.4 million, or 27.4% of average total direct compensation. While only one CEO (Steve Jobs of Apple) did not receive compensation of any kind in 2006, 17 CEOs (7.1%) did not receive a bonus.

Eighty-six percent of the firms in our sample paid a dividend, with the average dividend yield being 1.72%. Later in the paper we test if a company's dividend yield is correlated with the amount of options granted to the CEO in 2006.

CEO compensation may be correlated to company size if larger companies are more difficult to manage or have more resources to pay the CEO. The size of a company, which may seem intuitive, is actually difficult to quantify. Market capitalization, which is the equity value of the company, is a commonly used proxy for company size. While larger companies generally have larger market capitalizations, the growth potential of a company, the amount of debt it has, and the industry of the company are all variables not obviously connected with size that affect market capitalization.

The number of employees is another variable that seemingly has a clear connection to firm size. The more employees a company has, the larger it is. However,

consider Wal-Mart with 1.9 million employees and Microsoft with a mere 79,000 employees. Compared to Wal-Mart, Microsoft would be a very small company by this measure. Wal-Mart has 24 times the employees of Microsoft, but is Wal-Mart 24 times “bigger?”

The total revenue of the firm is another commonly used proxy for size. Total revenue suffers from some of the same shortcomings as market capitalization and number of employees in that there is substantial variation of total revenue due to variables not associated with size. For example, a mining company may have high total revenues but a small profit margin; its market capitalization would be low, and its operation would require relatively few workers. With these contrasting size measures, one can see that it would be difficult to categorize the mining company as either large or small.

We use all three variables, market capitalization, number of employees, and total company revenue in 2006 as company size proxies. As one could imagine, there is multicollinearity between market capitalization, number of employees, and market capitalization. This will be discussed in the results section.

With regards to choice of a performance proxy variable, we use total shareholder return in our final regressions. Shareholder returns is the ultimate criteria that shareholders care about; if pay is related to performance in any way, it should be related to how well the shareholders do. Additionally, the literature commonly uses shareholder return to measure pay-performance relationships. The un-weighted average total shareholder returns in 2006 for our 236 companies is 12.98%, similar to the 11.6% return on the dollar weighted S&P 500 index (both returns include dividends). What is somewhat surprising is the large range of returns and the rightward skew of returns. The

worst performing company (Lennar Homes) lost 51.7% of beginning year value while the best performing company (Northeast Utilities) returned +363%. The median return is 6.98%, with the mean at 12.98%.

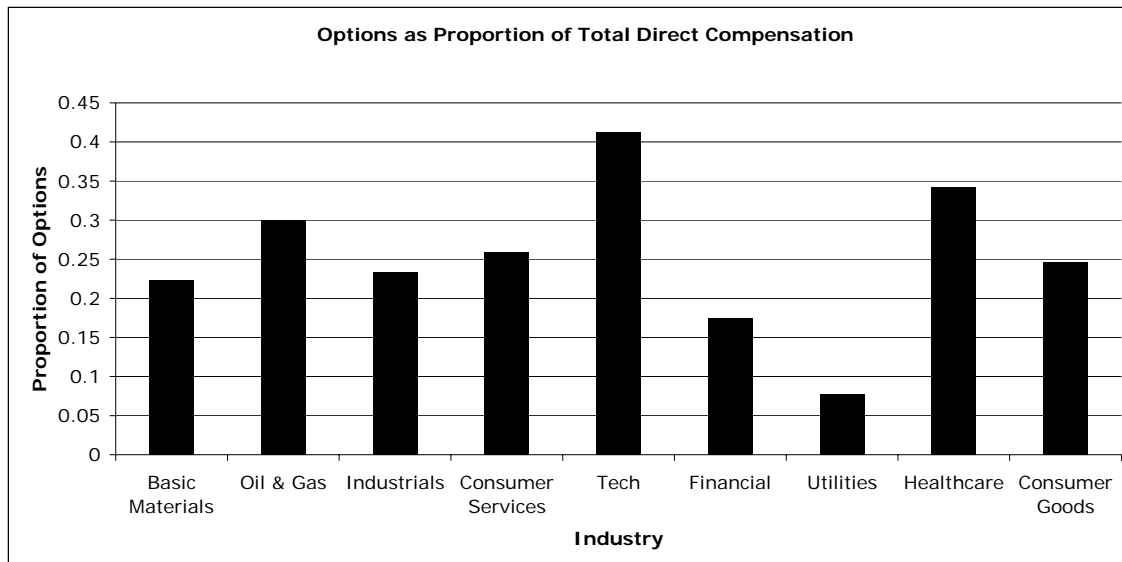
In addition to data on the company, we also added data on the CEO. CEO chair is a binary variable that is 1 if the CEO is also chairman of the board of directors. Eighty-one percent of the CEOs in our sample are also chairmen. CEO Outside is a binary variable that is 1 if the CEO is directly hired from the outside. Twenty-one percent of the CEOs in our sample were hired this way.

CEO tenure is the time the CEO has been serving as CEO with his or her current company. The minimum tenure in our sample is 3 years, since CEOs below that tenure were dropped from the sample. Robert Ingle of Ingle's Market is the longest serving CEO at 42 years. The mean tenure of all CEOs in our sample is 8.2 years, with a median of 6 years. CEO age is the current age of the CEO. The mean and median CEO age is 57 years. We predict that CEO pay is correlated with these personal attributes of the CEO along with company performance.

Seventy-two percent of companies in our sample compensate their executives with options. Of all companies, the mean option compensation is \$2 million with a median of \$1.39 million.⁷ The proportion of options in total direct compensation varies substantially with the firm's industry. On average, option grants account for over 40% of a technology CEO's compensation while accounting for less than 10% a utility CEO's compensation (Chart 3).

Chart 3: Options as Proportion of Total Direct Compensation

⁷ Options are valued at the grant day.



4. Results

To examine the determinants of CEO pay, we estimated cross-sectional regressions of 2006 compensation on company performance, firm size, and CEO characteristics. The norm in the literature is to use panel time series regressions to estimate change in compensation and change in performance by first order differences. While the time series approach definitely has advantages in the number of data points and the ability to see change over time, we believe that there are also shortcomings that are better addressed by the cross-sectional approach. First, by narrowing our scope to 2006, we were able to extensively screen for special circumstances (signing bonus, mergers, bankruptcy) that have large effects on CEO pay. We looked at each company's 10K and 14A statements to make sure that 2006 was a normal operating year for the company, and its CEO pay was not subject to large outside shocks such as corporate restructuring, allegations of mismanagement, or bankruptcy of the company. The diagram on page 10 shows the companies that were removed from the sample as a result of this selection process. Second, our data set gives us a precise estimate of the elasticity of the

determinants of CEO pay in 2006. Panel time series regressions generally report average elasticities over a five or ten-year period. With the recent explosion in CEO pay, the five-year average may not be representative of compensation practices in the first or last year.

The final regression specification of we estimated is:

$$\begin{aligned}
 \text{Log}(\text{Total Direct Compensation}) = & \\
 & \alpha + \\
 & \beta_1 \text{Log}(1 + \text{Total Shareholder Return}) + \\
 & \beta_2 \text{Log}(\text{Market Capitalization}) + \\
 & \beta_3 \text{Log}(\text{Employees 2006}) + \\
 & \beta_4 \text{Log}(\text{Revenue 2006}) + \\
 & \beta_5 \text{Log}(\text{CEO Chair}) + \\
 & \beta_6 (\text{CEO Outside}) + \\
 & \beta_7 (\text{CEO Tenure}) + \\
 & \beta_8 (\text{CEO Tenure}^2) + \\
 & \beta_9 (\text{CEO Age}) + \\
 & \beta_{10} (\text{CEO Age}^2) + \\
 & \varepsilon
 \end{aligned}$$

Regression (1) of Log (Total Direct Compensation) estimates the determinants of total CEO compensation. Regression (2) of Log (Bonus) estimates the determinants of the cash bonus portion of compensation. The bonus is a subset of total direct compensation; total direct compensation also includes base salary, restricted stock, and stock options.

Table 2 - Estimated coefficients (t-statistics in parentheses), * signifies significance at the 5% level, 239 Observations

	(1) Log(Total Direct Comp)	(2) Log(1+ Bonus)
Log(1 + Shareholder Return)	.298 (1.41)	.968 (1.66)
Log (Market Cap)	.249* (4.94)	.370* (2.63)
Log (Employees)	.0393 (.63)	-.0519 (-.30)
Log(Revenue 06)	.117* (2.05)	.197 (1.23)
CEO Chair	.332* (2.69)	.532 (1.55)
CEO Outside	.159 (1.33)	.299 (.89)
CEO Tenure	.0488 (1.91)	.909 (1.27)
CEO Tenure^2	-.00201* (-2.41)	-.00452 (-1.93)
CEO Age	.179 (1.73)	-.159 (-.55)
CEO Age^2	-.00161 (-1.80)	.00109 (.43)
R^2	.35	.15

4.1 Compensation and Performance

In the regression of Log (Total Direct Compensation), the coefficient of Log (1+Total Shareholder Returns) implies that a 10% increase in shareholder return yields roughly a 3% increase in CEO compensation. Although not statistically significant at the 5% level, the point estimate is large and positive. As mentioned before, there are theoretical reasons why the explicit relationship between compensation and shareholder returns is difficult to measure. Therefore, we separately tested the implicit link between compensation (cash bonus) and shareholder returns.

The regression of Log (Bonus) measures the implicit link between firm CEO compensation and firm performance. One thousand dollars were added to every CEO's bonus to include the 17 CEOs who did not receive a bonus.⁸ As predicted, the elasticity of Log (1 + Shareholder Returns) is larger and significant at the 10% level. The point estimate implies that compensation and shareholder returns increase almost one to one, as a 10% increase in shareholder returns results in a 9.6% increase in the CEO bonus.

As an alternative measure, we experimented with revenue growth and earnings growth instead of shareholder returns as proxies for company performance. The coefficient on revenue growth is very small compared to the coefficient on shareholder returns. This may suggest that the that the board of directors is more concerned with shareholder returns as opposed to revenue growth, or that there are more industry-fixed effects associated with revenue growth causing a larger variance due to multi-collinearity. Furthermore, it is not clear that a strong link between revenue growth and CEO compensation is as desirable to shareholders: not all expansion is good for a firm, since the company may have to do so by cutting prices or entering markets in which the firm is

⁸ To avoid the problem of Log(0).

less expert. With regard to using earnings as a performance proxy variable, consider that earnings are the difference of revenues minus costs. Therefore, earnings growth is the change of a difference, and is highly volatile across firms. With such a large variance, no significant relationship between CEO compensation and earnings growth was found.

4.2 Compensation and Firm Size

In considering the relationship between CEO compensation and firm size, it is important to note that shareholder returns are bounded by a relatively narrow range as compared to firm size (see Data Description). It follows then, that since firm size has both a larger variance and a larger and more significant coefficient than shareholder returns, that firm size is the larger determinant of CEO compensation. Additionally, the R^2 of the regression of the log of total direct compensation on *only* the size variables (Log Market Capitalization, Log Employees, and Log Revenues 2006) is 0.26; the R^2 of the regression of total direct compensation on all nine explanatory variables in Table 2 is only 0.35. Therefore, size proxies account for approximately 75% of the variation in total direct compensation that is explained by that regression. However, this strong correlation says little regarding the causality of the link. It is possible that the causality may run from firm size to CEO compensation, or in the reverse direction; a higher paid CEO may command positions at larger firms as a result of having greater ability.

4.3 Compensation and CEO Specific Variables

The data show, after holding tenure and market capitalization constant, that being chairman of the board gives a CEO a 35% raise. There are two explanations for why a CEO who is also chairman earns 35% more than a CEO who is not chairman. One explanation is that board chairmanship is a proxy for the CEO's influence on the board of

directors, and CEOs who are able to influence the board use that power to raise their own salary. The other explanation is that, after a CEO serves effectively for a period of time, he or she is rewarded with board chairmanship. Therefore CEOs who are also chairmen earn the title, and also the extra compensation. To test the second hypothesis, we regress CEO Chair on CEO Tenure to see if longer tenure is correlated with being chairman of the board.

Table 3 - Estimated coefficients (t-statistics in parentheses), * signifies significance at the 5% level, 239 Observations

	CEO Chair
CEO Tenure	.01* (4.94)
Constant	.70* (18.59)

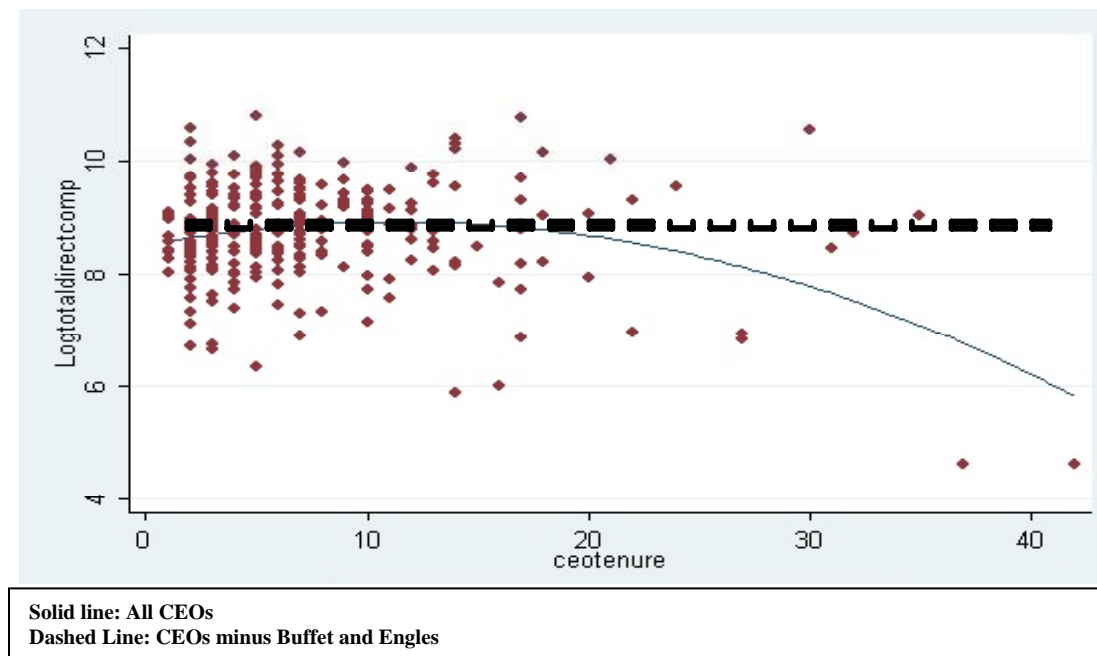
There is some evidence that the probability of being chairman increases with tenure. This regression shows that each additional year of tenure increases a CEO's chance of being chairman by approximately 1%. However, a new CEO has a 70% chance of being chairman, and with CEO tenure averaging 6 years, the average tenured CEO has only a 6% greater chance of being chairman than a brand new CEO. Therefore, longer tenure is probably not adequate to explain the 35% difference in pay between CEOs who are and are not chairmen.

Another theory we test is whether there are differences in inside-firm and market salaries for CEOs. Inside-firm salary is the compensation of a CEO that is promoted from within a company, while market salary is that of a CEO who is hired from outside the

firm. There are reasons to believe that inside-firm salaries are lower than market salaries. For example, an inside hire may be familiar with the company and more willing to take the CEO position than an executive who has to be recruited away from another firm. Also, adjustment, relocation, and other personal costs are lower for an inside hire who than an outside hire. The results from the regression shown in Table 2 tend to confirm this hypothesis, although the coefficient on CEO Outside, while large at 13.9%, is not significant at the 5% level.

The final CEO-specific relationship with total direct compensation that we consider is the log of total direct compensation and CEO tenure. Simply from plotting this relationship, it appears that there is a quadratic fit to the line.

Chart 4 Quadratic Fit of CEO Tenure and Total Direct Compensation



In fact, referring back to Table 2, the coefficient on $(\text{CEO Tenure})^2$ is negative and significant. Therefore, assuming that the quadratic relationship is the true functional form, each additional year of tenure has a positive but decreasing effect on total direct

compensation, until the local maximum is reached. Then, each additional year of tenure will have a negative and increasing effect on total direct compensation.⁹ This maximum point when CEO tenure will begin to have a negative affect on total direct compensation is 12.1 years.¹⁰ Forty two CEOs, or 17.5% of the sample, have tenures greater than 12.1 years, so this local maximum is well within the data set.¹¹

However, a glance at Chart 4 shows two outliers at the bottom corner of the graph. These two points represent Warren Buffet of Berkshire Hathaway (37 years) and Robert Ingle of Ingles market (42 years) respectively. If these two outliers are omitted, the relationship between total direct compensation and CEO tenure becomes nearly zero, and statistically insignificant.

Both Buffet and Ingle are founders of their respective companies. Core, Holthausen, and Larcker have found that CEO compensation is negatively related with the CEO's ownership stake in the company. Perhaps it is true, then, that founders who have been with their companies for over 30 years are paid less in salary, but excluding those CEOs, there is no significant trend between total direct compensation and CEO tenure.

4.4 Options and Dividend Yield

Options reward CEOs for nominal stock price appreciation rather than total shareholder returns, which also include dividends. We test whether firms that granted

⁹ The affect of an extra year of tenure on compensation is computed by taking the first derivative of quadratic regression. $\frac{\Delta totaldirectcompensation}{\Delta tenure} = .0488 + 2(-.00201)tenure$

¹⁰ The maximum of a quadratic equation is where the first derivative is zero. Solving for tenure, we get:
 $max\ tenure = \frac{.0488}{2(.00201)} = 12.1\ years .$

their CEOs more stock options in 2006 have a lower dividend yields. Of course, it is likely that CEOs who were granted options in 2006 were also granted options in previous year. We would really like to know the relationship between the total stock of options that the CEO has and the firm's dividend yield. However, data with the total stocks of CEOs' options was unavailable to us. We use the CEOs' options grants in 2006 as a proxy for total stock of options with the assumption that option grants in 2006 and the total stock of options are highly correlated. Out of our sample of 236 firms, 145 both grant options and issue dividends. For these 145 firms, we estimate the regression:

$$\begin{aligned} \log(\textit{dividend yield}) = & \\ & \alpha + \\ & \beta_1 \log(\textit{options}) + \\ & \beta_2 \log(\textit{market capitalization}) + \\ & \beta_3 \log(1 + \textit{shareholder returns}) + \\ & \varepsilon \end{aligned}$$

Table 4 - Estimated coefficients (t-statistics in parentheses), * signifies significance at the 5% level, 145 Observations

	Log (Dividend Yield)
Constant	2.38* (4.82)
Log(Options)	-.30* (-4.06)
Log (Market Cap)	.18* (3.24)
Log (1 + Shareholder Returns)	-.95* (-3.54)
R²	0.17

Table 4 shows that a 10% increase in options lowers the dividend yield by 3%, which is significant at the 1% level. Dividend yield is measured in percentage points, so it is important to distinguish between a percent increase and percentage point increase. For example if the baseline dividend yield were 1%, a 10% increase in options would increase dividend yield to 1.1%, not 11%. One interesting fact is that shareholder returns are negatively correlated with dividend yield. This may be because high dividend paying companies tend to have relatively low betas and thus had lower returns in a bull year.¹²

Based on the regression in Table 4, it is not entirely clear why a company that compensates its executive with more options is expected to have a lower dividend yield. Because we can only see one year's worth of data, we do not know if the dividend yield decreased as a result of the options grant. After all, the current dividend yield is taken

¹² The un-weighted average total shareholder returns in 2006 for our 236 companies is 12.98%, similar to the 11.6% return on the dollar weighted S&P 500 index (both returns include dividends).

into account when valuing the option grant. However, consider the following reasoning for the relationship that we see in Table 4. Perhaps high dividend companies have a tendency to raise the dividend over time. The CEO of such a company would be reluctant to accept large option grants in his or her compensation package, because they would be devalued when the dividend rate increases.

Theoretically, if the company and CEO could accurately predict the increase in the dividend during the life of the option, then this could easily be factored into the initial option grant. However, given that CEO options commonly have durations of seven years, accurately estimating the dividend yield during this time would be very difficult if not impossible. Although option grants are not taxed at the grant day, their value as it is reported to the SEC and the shareholders assumes constant dividends. It may be difficult to explain to shareholders that the CEO needs more options because of expected dividend increases during the life of the option. Furthermore, after receiving the options, if the CEO could influence the company's dividend rate, he or she would be inclined not to increase it!

The proportion and value of total direct compensation in the form of grant day valued options varies quite dramatically across industries. For example, over 40% of a technology CEO's compensation is in options while they constitute less than 10% of a utility company's CEO compensation. A simple explanation is that there are institutional and cultural differences between companies and industries, which let some favor granting options while others favor other forms of compensation. Another explanation is that options give CEOs in growth industries the incentive to make long term, risky investments that will not show in next year's company performance data. This is

accomplished in two ways. One, assuming that a long-term investment is public; an efficient market will instantaneously bid up the share price making the CEO's options more valuable. Two, even if the CEO's investment decision is wildly unpopular with the market and the board, the CEO would still be compensated in the future if the investment paid off (provided he or she does not get fired for the unpopular idea). Additionally, the seven-year duration of most executive options leaves plenty of time for his or her idea to bear fruit.

To test if industry-fixed effects account for differences in the effects of options on the dividend yield, we ran the same regression as above in Table 4, but included industry dummies. The coefficient on the options term maintains its magnitude and significance from the regression in Table 4 when the industries fixed effects are added; most of the industry dummies are insignificant (results not shown). It is quite reasonable that the use of options differs systematically across industries, but with only 145 firms over 9 industries our sample may be too small to pick up a significant relationship.

5. Trends

The results in the previous section describe the relationships between CEO compensation and performance, tenure, chairmanship, and dividends in 2006. Though 2006 estimates tell us how much CEO compensation is related to performance today, it is impossible to say whether this relationship is large or small in the historical context.

One way of putting the pay for performance sensitivities we reported into context is to look at the trend of CEO compensation to performance sensitivities over time. Kevin Murphy (1999) reports the average sensitivity of cash compensation (salary and bonus) to

performance of S&P 500 companies for the periods between 1970 and 1996. We add our results to the Murphy table.

Table 5

Historical Trends in the Elasticity of Cash Compensation to Shareholder Returns

Independent Variable	Dependent Variable ln(cash compensation)			
	1970s	1980s	1990- 1996	2006 With Control Variables
Intercept	.0476 (11.8)	.0423 (8.1)	.0593 (6.2)	6.45 (2.55)
Ln(1+return)	.0940 (7.8)	.2143 (11.8)	.2625 (8.1)	.227 (1.27)
R ²	.0273	.0558	.0281	0.31
Sample Size	2,192	2,353	2,263	236

It is important to note that we use a different methodology than Murphy, though we attempt to capture the same effect. Murphy uses panel data and time series regressions with the given years, while we look at a cross section of CEO compensation in 2006. Murphy's dependent variable is the change in salary plus bonus from the previous year on shareholder returns during the same time. This is reasonable because not only will a CEO receive a nice bonus after a good year, but his or her salary for the next year will also increase. Therefore, Murphy is able to pick up changes in baseline salary relative to performance in these time series regressions.

The sensitivity that we report from our results comes from the regression in Table 2. This regression controls for the variables with coefficients β_2 to β_9 , because our cross-sectional regressions require us to control for firm size and other factors that Murphy does not control when using panel data. However, Murphy's regressions are not able to

account for corporate restructuring, bankruptcy, CEO turnover, and other factors that affect compensation, which are not represented by performance indicators. We see therefore, that there are advantages and disadvantages to both the panel time series and cross sectional approaches, as we discussed earlier.

Keeping aside our methodological differences, we were unable to find a significant change in the elasticity of cash compensation to shareholder returns in the last ten years. The point estimate for our elasticity for the year 2006 is .227, compared to .2625 between 1990 and 1996. However, the t-statistic of our coefficient is only 1.27. This may suggest that in a cross-sectional analysis, there is much too much variation to precisely estimate the cash compensation to shareholder returns elasticity over one year, particularly within our sample.

Jensen and Murphy in 1990 discuss trends in pay for performance elasticities over a longer period of time. They point out that in the 1930's, the sensitivity of corporate pay to company performance was actually significantly higher than in 1970. Specifically, for a \$1000 increase in shareholder wealth in 1934, a CEO received an additional 17.5 cents, whereas in 1974 he or she would only receive an additional 1.9 cents (Jensen and Murphy, 1990). This downward trend in sensitivity of pay to performance between 1930 and 1970 may be explained by fact that the CEO's equity stake in the firm decreased as firms got bigger and equity markets became more accessible. However, we see that this decreasing trend in sensitivity has reversed since the 1970s. It is possible that increased vigilance by shareholders and more transparent disclosure rules have led to the upward trend in sensitivity. Furthermore, the proportion of equity in total compensation, especially in the form of options, has increased in the last 30 years. This fact may also

contribute to an underestimation of the sensitivity of total direct compensation to shareholder returns, as it is reported in Table 5.

6. Conclusions

This paper has examined the factors affecting CEO compensation in 236 large US companies in 2006. When testing the sensitivity of pay to performance, we considered the validity of the principal-agent model as well as test potential agency problems directly. Since managerial power theory suggests a “power-pay relationship,” we tested the links between CEO compensation, his or her tenure, and chairmanship. Finally, we inspected the unclear relationship between dividend yield and options use.

In testing the link between CEO compensation and performance we found that the elasticity of total direct compensation to shareholder returns is 0.298 and the elasticity of bonus compensation to shareholder returns is 0.968. This seems to be larger than the elasticity in the 1990s, although by how much it is unclear.

Although our results show there is a significant relationship between shareholder returns and CEO compensation, CEO compensation is also influenced by many non-performance variables. These relationships may indicate weaknesses in the principle-agent model relating to executive compensation. Measures of firm size account for about 75% of the variation in CEO pay that is explained by our regression. CEOs who are also the chairman of the board, on average, earn 35% more than CEOs who are not chairman.

Excluding two outliers, we did not find a significant relationship between compensation and CEO tenure. However, it may be the case that CEOs with extremely long tenures accept less compensation. This is consistent with Core, Holthausen, and Lacker (1999) findings that compensation decreases with the value of the equity position

the CEO has in the company. Furthermore, CEOs promoted from the inside are compensated less than outside hires, although this effect is not significant. Finally, companies that grant more stock options tend to have lower dividend yields, although the reasons are unclear.

In sum, we find that CEO compensation is somewhat aligned with firm performance, but we were not able to determine if this trend is increasing or decreasing within the last 10 years. However, non-performance variables, such as firm size and whether the CEO is chairman of the board, account for much more of the variation in CEO compensation that was explained by our regressions than did shareholder returns. Thus, we are able to give an overview of the determinants of CEO compensation in 2006, though our relatively small sample size makes our exact findings preliminary. A more extensive survey will require data on a larger cross-section of firms, as well as perhaps some longitudinal data.

Throughout this paper we do not take a stance on whether CEOs are compensated appropriately. Pay to performance elasticities could triple from the current state, and some would still claim that it is not enough. This normative question is certainly beyond the scope of this paper, and would require a theoretical analysis of U.S. labor markets in general, and relative levels of compensation for other professionals. For now, it may be a question best addressed in the meetings of individual firms' compensation committees. This paper does aim to educate readers, including individuals in the general public concerned with the levels of CEO pay, as well as those involved in CEO pay setting practices on the current state of executive compensation.

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