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EXECUTIVE COMPENSATION: FACTS

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Executive Compensation: Facts.*

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Abstract

In this paper we describe the important features of executive compensation in the US from 1993 to 2006. Some confirm what has been found for earlier periods and some are novel. Notable facts are that: the compensation distribution is highly skewed; each year, a sizeable fraction of chief executives lose money; the use of security grants has increased over time; the income accruing to CEOs from the sale of stock increased; regardless of the measure we adopt, compensation responds strongly to innovations in shareholder wealth; measured as dollar changes in compensation, incentives have strengthened over time, measured as percentage changes in wealth, they have not changed in any appreciable way.

Key words. CEO, Pay–Performance Sensitivity, Stock, Options.

JEL Codes: G34, J33, M52.

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1 Introduction

In 2008 the precipitous drop in real estate prices put financial companies' risk–taking in the spotlight. It is not at all surprising that, in such a climate, executive compensation came under increased attention. Compensation was singled out as one of the most important and deeply flawed elements of the incentive system that induced firms to accumulate enormous amounts of risk on their balance sheets. In Clementi, Cooley, Richardson, and Walter (2009) we describe many of the flawed practices in financial firms. But executive compensation more broadly has long been a sensitive issue and financial crises have a tendency to focus increased attention on it. In 1929 for example much attention was focused on the compensation of Eugene Grace, the president of Bethlehem Steel, who faced a huge uproar when it was revealed that he received a base salary of $12,000 and a bonus of more than $1.6 million. That amounts to $150,000 salary in 2009 dollars with a nearly $20 million bonus.

Throughout the 1930's there was much hue and cry about executive compensation and many proposals to cap it. The most important case in that era involved George Washington Hill the President of American Tobacco and other senior executives. In that case several executives of American Tobacco Co. had received bonuses that plaintiffs claimed were excessive. The bonuses were paid under a plan that had been approved by shareholders in the form of a by–law adopted in 1912. The by–law provided that if the net profits of American Tobacco exceeded about $8.2 million in any year, the president of the company would receive payment of 2.5 percent of such excess, and each of five vice–presidents would receive 1.5 percent, an aggregate of 10 percent of the annual net profit exceeding $8.2 million. The case eventually went to the Supreme Court and in Rogers v. Hill (1933), the Court ruled that overall compensation must be reasonable in proportion to the value of the services rendered. The dissenting opinion of Judge Swan indicates the applicable rule: "If a bonus payment has no relation to the value of services for which it is given, it is in reality a gift in part, and the majority stockholders have no power to give away corporate property against the protest of the minority."

In the past two decades there has been much discussion of executive compensation, many public examples of lavish pay, but no real consensus on the extent of the problem if indeed there is one. In part, this is because there is a lack of clarity about what the facts are. In this paper, we take a careful look at executive compensation in the United States in the period 1993–2006. We investigate the cross–sectional and time–series variation in compensation, paying particular attention to the role played by the various components of executives packages and to the implications for incentive provision.

Our study differs from most other contributions to the literature in that our main measure

of compensation is the year–on–year change in the portion of executive's wealth that is tied to the firm. In other words, we define compensation as the sum of salary, bonus, the year–on–year change in the value of stock and option holdings, the net revenue from the sale of stock and exercise of options, and the value of newly awarded securities. We prefer this definition because it aligns most closely with the concept that emerges from the analysis of multi–period theoretical models of the relationship between managers and shareholders.

The AFL–CIO, the federation of 56 US and international labor unions,[1] recently stated that "*The chief executive officers of large U.S. companies averaged $10.8 million in total compensation in 2006, more than 364 times the pay of the average U.S. worker, according to the latest survey by the United for a Fair Economy.*" We find that the average compensation of CEOs of publicly traded US companies was actually much higher than $10.8 million but the average is wildly misleading because the compensation distribution is always highly skewed. The median compensation in 2006 was *only* $4.85 million.

CEOs of large companies tend to sit on large stock and option portfolios. Accordingly, rapid rises in their companies' stock prices lead to handsome financial rewards. But it also means that they suffer significant wealth losses when those prices fall. Every year a substantial fraction of CEOs actually lose money.

Salary and bonus payments account for a very small fraction of compensation, and their cross–sectional dispersion is rather limited. In light of this finding, the policy debate on capping these two components of compensation appears to be misplaced.

Looking at the characteristics of compensation over time, we find that the dollar value of stock and option grants increased at a brisk pace for most of the 1990s. At the same time, however, the median value of stock holdings declined. This is consistent with the finding that during those years executives relinquished much of the stock they acquired through their compensation packages.

We estimate the sensitivity of pay to firm performance using three of the many indicators proposed in the literature. No matter the measure considered, we find that executives' financial rewards respond strongly to innovations in shareholder wealth.

When using the methodology due to Aggarwal and Samwick (1999), we estimate that a $1,000 increase in shareholder wealth is associated with almost a $35 rise in CEOs wealth for the lowest–volatility companies. This is higher than the $28 estimated by Aggarwal and Samwick (1999) for the 1993–1996 period. According to this measure, incentives have strengthened. However, the elasticity of CEO wealth with respect to shareholder wealth is shown to be time–invariant at about 1.17. In light of the increase in shareholder wealth that occurred

[1] http://www.aflcio.org/corporatewatch/paywatch/pay/index.cfm

after 1996, these findings are not inconsistent.

The remainder of the paper is organized as follows. In Section 2 we describe the data and define our measurement conventions. In Section 3 we document the extent of separation between ownership and control in the population of US public corporations. Section 4 characterizes the most salient features of the distribution of compensation across executives. In Section 5 we study how compensation varies with firm size and across sectors. Section 6 is dedicated to the analysis of the time variation. The estimates of pay–performance sensitivity are illustrated in Section 7. Finally, Section 8 concludes.

2 Data and Measurement

We draw our data from the EXECUCOMP database, maintained by Standard & Poor's. EXECUCOMP gathers data from 1992 to the present on the compensation of up to nine executives of all US companies whose stocks are traded on an organized exchange. The source for the database are companies' filings with the Securities and Exchange Commission. The information about executives' securities holdings and their compensation packages is contained in the DEF14A forms (or Schedule 14A), filed annually by corporations pursuant Section 14(a) of the Securities Exchange Act of 1934.

We confine our attention to the years 1992 through 2006, the last (fiscal) year for which we have comprehensive information. Our sample consists of information on 31,587 executives, employed by 2,872 companies, for a total of 33,896 company–executive matches and 167,822 executive–year observations.

2.1 Measuring Compensation

It is well known that executives are compensated in a wide variety of ways. Murphy (1999) provides a detailed description of the main components of compensation packages. Among them are salary, bonus, stock and options grants, severance payments, 401K contributions, and life–insurance premia.

Because of the complexity that characterizes compensation packages, defining summary measures of compensation is far from straightforward. The most common among such measures, employed by Frydman and Saks (2006) and Bebchuk and Grinstein (2005) among others, consists of the sum of salary, bonuses, long–term incentive plans, and grant–date value of securities awards.[2] In the remainder of the paper, we will refer to this as the *classical* definition of compensation.

[2]See page 9 of Frydman and Saks (2006) and page 284 of Bebchuk and Grinstein (2005) for their respective definitions.

Unfortunately the classical definition provides little information about the change in wealth that accrues to an executive from his or her relationship with the company in a given year. In fact, as will be clear below, the change in wealth is mostly the result of factors – such as the change in value of stock and option holdings, and the net revenues from trade in stock – that are not accounted for in this measure.

In this paper we consider an alternative definition of compensation, along the lines of what was proposed by Antle and Smith (1985) and what was adopted in studies of pay–performance sensitivity by Hall and Liebman (1998) and Aggarwal and Samwick (1999). We will refer to it as *Total Yearly Compensation*. Roughly speaking, it is defined as the year–on–year change in *Executive's Wealth*, which in turn consists of the expected discounted value of the portion of executive's wealth whose value is tied to his or her company's performance. In the words of Antle and Smith (1985), Total Yearly Compensation is meant to measure "*the annual change in executive's total wealth associated with employment*".

The adoption of Total Yearly Compensation in lieu of the classical measure is motivated by the recent literature on multi–period models of executive compensation such as Wang (1997) and Clementi, Cooley, and Wang (2006), among others. These models explicitly acknowledge that the utility reward an executive receives from association with the company in a given period depends on the change in current and future consumption that takes place during that period. This change depends on awards of securities and promises of deferred payment received in the past, current and expected compensation packages, and on the conditional probability of termination.

Since most securities awards are restricted, the design of current and future compensation packages *must* depend on past compensation. Everything else equal, different stock and options holdings will call for different contractual provisions both in the present and in the future. For this reason, looking at these provisions in isolation will be misleading. That is, it will give an inaccurate picture of the change in current and future consumption possibilities that derive from employment by the company.

This approach is supported by anecdotal evidence from corporate communications. For example, according to 2006 Oracle Corporation's DEF14A, the factors considered by that company in determining the size of option grants include "*the intrinsic value of outstanding, un–vested equity awards and the degree to which such values supports our retention goals for each executive.*"

Our ideal measure of wealth consists of the value of stock and options in the executive's portfolio plus the expected discounted value of all future handouts in form of cash and securities. Operationally we define it as the market value of securities holdings plus the expected

discounted value of future salaries and bonuses. Total yearly compensation consists of the sum of salary, bonus, the year–on–year change in the value of stock and option holdings, the net revenue from the sale of stock and exercise of options, and the value of newly awarded securities.

Throughout the paper, we will also consider the partition of compensation into Current and Deferred. Current compensation includes all claims that can be instantaneously traded for consumption goods. Deferred compensation, the residual part, consists of the current expected value of all claims over future consumption. This partition is of particular interest because the theoretical analysis of executive compensation in dynamic moral hazard models implies restrictions on the relative role the two portions play in incentive provision.

Operationally, we define Current compensation as the sum of salary, bonus, dividends, and net revenues from trade in stock. Deferred compensation is the sum of the yearly changes in the value of stock and options in portfolio, retirement benefits, expected future salaries, and other deferred payments.

The precise definition of all variables can be found in Appendix A. For our purposes, the EXECUCOMP database presents two major shortcomings. To start with, EXECUCOMP only includes the value of options that are in-the-money. This greatly complicates the estimation of the year–on–year change in the value of option holdings. Furthermore, the database provides no information on purchases and sales of stock by the executives. This makes it hard to come up with an accurate measure of the net revenue from trade in stock.

We consider two alternative definitions of option holdings. The first, which is used by Aggarwal and Samwick (1999), is simply the sum of two EXECUCOMP variables, namely the value of the un-exercisable in–the–money options and that of the exercisable in–the–money options, both computed at the money at the end of the fiscal year.[3] Since it does not take into account the value of out–of–the money options, this definition introduces an upwards bias in the absolute value of the fluctuations in options values. The alternative definition estimates the value of out-of-the-money options by means of a simple algorithm due to Himmelberg and Hubbard (2000). The details of the procedure are illustrated in Appendix A.1.[4]

By net revenue from trade in stock, we mean the difference between the revenues from sales of stock and the expense incurred in acquiring shares (either by purchase or option exercise). Executives may (i) purchase and sell common stock on the open market, (ii) purchase common

[3] In the latest version of the database, the two variables are labeled OPT_UNEX_UNEX_UNEXER_EST_VAL and OPT_UNEX_UNEX_EXER_EST_VAL, respectively. In the previous version, their names were INMOUN and INMONEX.

[4] For the sake of brevity, this draft does not include the results obtained with this second method. They are available from the authors upon request.

stock directly from the company at prices much lower than the market's, (iv) inherit stock[5] (iii) donate stock.[6] Unfortunately, we cannot track either the prices or quantities of these transactions. Furthermore, we do not know whether the shares obtained by exercising options are kept or sold. For this reason, we resort to a simple algorithm that allows us to estimate the net revenue from trade using other variables provided by EXECUCOMP. The algorithm is described in Appendix A.2.

3 Separation Between Ownership and Control

In the last thirty years or so, thousands of pages have been written on executive compensation, both in the academic and popular press. Among the reasons for this intense interest is that executive compensation is thought of as the most powerful tool to align the goals of owners and managers of modern corporations. That these goals are misaligned because of the separation between ownership and control is taken to be one of the defining characteristics of public corporations.

Since the appearance of the influential work by Berle and Means (1932), the standard characterization conceives of executives, and CEOs in particular, as professionals hired by shareholders to run their companies. This view takes the separation between ownership and control, intended in its most extreme version, as a fact. However, even to the distracted observer it should be obvious that in reality there is an enormous variation in the degree of separation. Figure 1 substantiates this claim, by showing the cumulative distribution of CEO equity stakes among US public corporations in 2006.

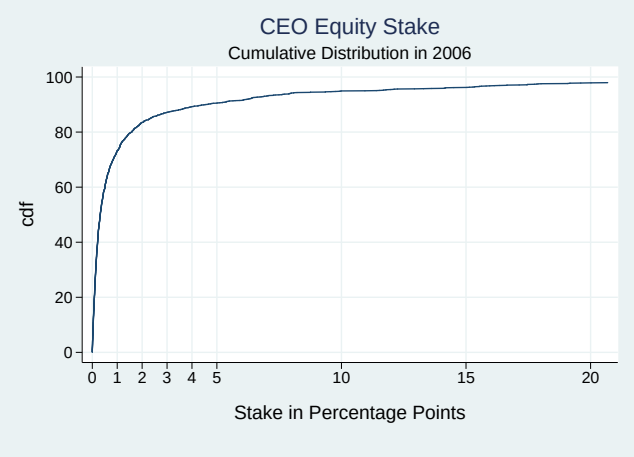

Figure 1: CEO Equity Stake in 2006.

[5]For example, in 1999 Carnival CEO Mickey Arison inherited stock from his father.
[6]Mr. Warren Buffett, the larger shareholder and CEO Berkshire Hathaway, made several donations in stock.

Our data shows that in 2006, about 25% of CEOs held more than 1% of their companies' common stock, and about 10% held more than 5%.[7] CEOs with relatively low stock holding fit the Berle and Means' stereotype, in the sense that they are likely to have been hired only to manage the company. This is the case, for example, of Mr. John W. Thompson, who spent most of his career at IBM before being hired as Symantec's CEO in 1999. In 2006, Mr. Thompson held about 0.16% of the company's common stock. The CEOs with the largest equity stakes are far from the Berle and Means' ideal and are likely to be either the companies' founders or to have family ties to them. This is the case of Micky Arison, CEO of Carnival Corporation – the world's largest cruise operator – and son of Ted Arison, the company's founder. In 2006, Mr. Arison held about 23.8% of Carnival's common stock.

As will be clear below, stocks have a primary role in incentive provision. In the case of professional CEOs such as Symantec's Mr. Thompson, the observed equity stake is the result of the company's compensation policy. Therefore, the incentives that result can be used to assess the disciplining role of boards of directors. This is decidedly not the case for company founders and for other executives, such as Mr. Arison, whose large equity holdings have nothing to do with the company's compensation policy. These individuals, although disciplined by the requirements of public companies, essentially have absolute control over the source of their pecuniary incentives. Compensation committees can have very little impact on them.

In light of this simple argument, in the remainder of this paper we will report certain statistics for *Professional* CEOs only, arbitrarily defined as those that hold less than 1% of their companies' common stock. Our goal is discern the differences, if any, in the way in which professional CEOs are compensated and in the incentives they face.

4 The Distribution of Compensation across Executives

Figure 2 depicts the cross–sectional distributions of wealth and total compensation for the population of CEOs in 2006. The striking feature of both histograms is the right skewness. Median CEO pay in 2006 was *only* 4.85 million dollars. The exorbitant average pay of 45.7 million was mostly the result of sky–high compensation at the very top of the distribution.

Table 8 (refer to the rows labeled "Gross") reports a series of statistics of the compensation distribution, for all sample years. The skewness index of 27.15 [8] for 2006 was not an outlier. Skewness has been a feature of the CEOs' total compensation distribution throughout the

[7] We need to warn the reader about two caveats. On the one hand, the SEC does not require companies to disclose equity stakes lower than 1%. This is likely to bias our measure upwards. On the other hand, we don't include in our measure stocks held by other family members. This will introduce a downward bias.

[8] By skewness index we mean the ratio of third moment about to the mean to the standard deviation.

sample period. Notice, however, that the distribution is not always right–skewed. In the three (fiscal) years following the stock market peak of January 2000, the mean CEO compensation was largely negative, while the median values were positive. The reason is that, as illustrated in Section 5, CEOs of large companies have relatively high stock and option holdings. In turn, this implies that their compensation is particularly sensitive to stock market fluctuations, of either sign.

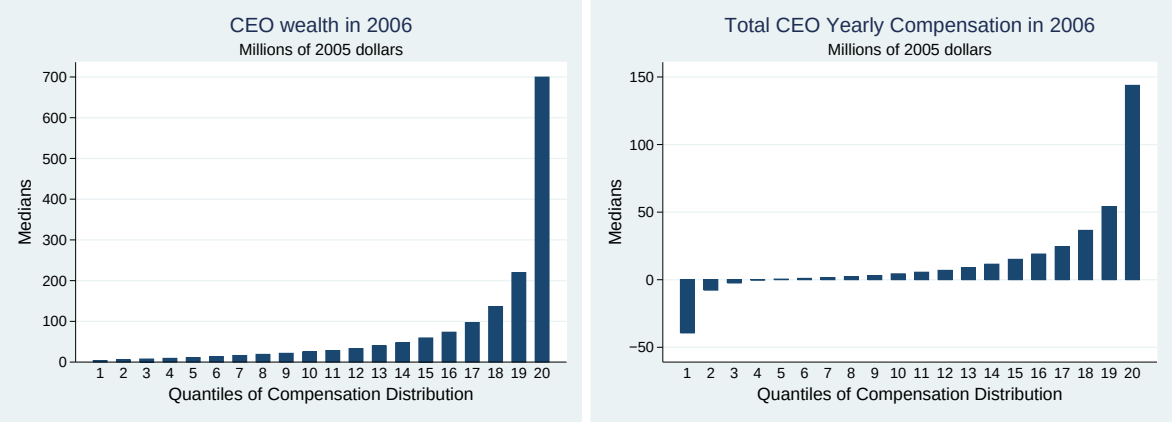

Figure 2: CEO Compensation in 2006.

This leads us to another salient feature of the data. Contrary to what has become common wisdom, CEOs do lose money. Sometimes, they lose a lot. In 2006, with the S&P 500 index rising by more than 9%, our measure of compensation was negative for as many as 264 CEOs. As expected, the big losers were those at the helm of companies whose stock dropped the most in value during the year. Among them, Yahoo (–33%), Amazon (–20%), and Ebay(–30%). Conversely, the winners were the chief executives of the companies whose shareholders gained the most, such as Mc–Graw Hill (+30%), Marriott (+38%), and Comcast (+65%). Table 8 shows that a sizeable fraction of CEOs lost money in every year. In 2002, that fraction exceeded 40%.

If executives hedge systematic risk, actual median gains and losses will be much smaller (in absolute value) than our figures suggest. For this reason, we also report statistics for Total Yearly Compensation, net of the return executives would have earned by investing their wealth in the market portfolio. See the rows labeled "Net of Market" in Table 8.

The *Net* definition yields the actual compensation under the assumption that executives hedge systematic risk by selling short the market portfolio or by building a similar position via trade on derivatives.[9]

[9] An example of such a position is a zero–cost collar, which involves selling an out–of–the–money call option

Hedging systematic risk has a large effect on the tails of the compensation distribution. It moderates losses in bad years for the stock market and moderates gains in good years. As a result, median net compensation tends to be smaller than gross compensation in a good year for the stock market, and larger in bad years. Table 8 shows that median net compensation ranged between –$100,000 (in 1998) and $5.82 million (in 2003). The main message we draw from these data, however, is the same as above. In every single year both dispersion and skewness were remarkably large.

Since the SEC does not require executives to disclose trades in securities not issued by their companies, we do not know whether executives indeed hedge market risk or not. However, Garvey and Milbourn (2003) provides indirect evidence that this may be the case.[10]

Refer once more to Table 8. The third row illustrates the results that obtain with the classical definition of compensation. The picture it conveys is rather different. In 2006, mean and median CEO pay were $6.74 and $3.24 million, respectively. Interestingly, the dispersion across executives is much lower than it is with our measure. According to the classical definition, the mean compensation of the top 10% in the distribution was about 35 million dollars in 2006 (against our estimate of $450.33 million). The mean compensation among the bottom 10% in 2002 was about $450,000, against a $336.86 million loss that obtains according to our definition!

Table 9 provides detailed information about the partition of total yearly compensation between Current and Deferred. A clear fact, better illustrated in Figure 3 in the case of 2006,

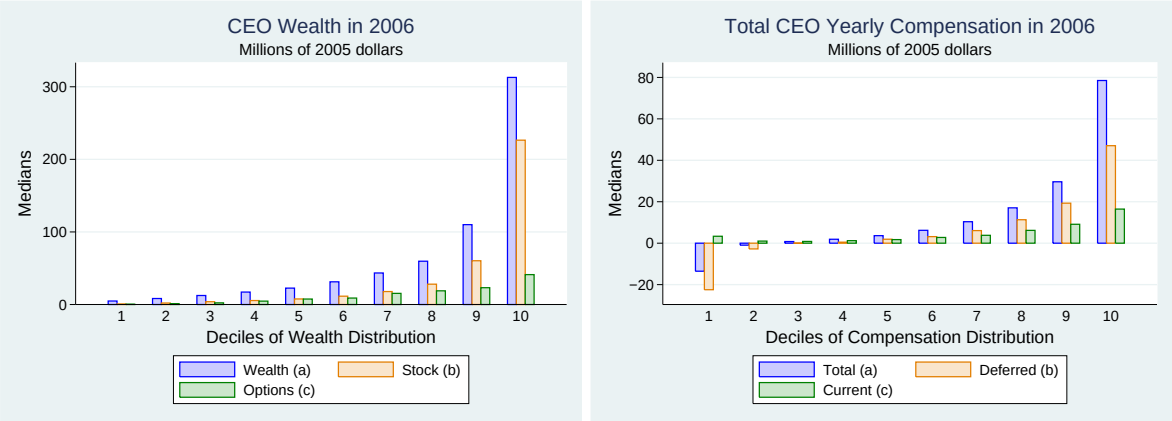

Figure 3: Split of Compensation in the Cross–Section

and buying an out–of–the–money put option.

[10] Garvey and Milbourn (2003) argue that if companies recognize that they should use relative performance evaluation (RPE) only for those executives that are unable to diversify systematic risk, estimates of pay–performance sensitivity should depend on market volatility only in the case of younger and poorer executives, whose chances of diversification are slimmer. This is exactly what they found in their study.

is the cross–sectional dispersion in the deferred component. Both big winners and big losers have large stock and option portfolios. To appreciate this, consider that the median equity stake among CEOs in the top and bottom deciles of the compensation distribution are 1.15 and 0.77%, respectively, against a 0.24% median for the remainder.

The cross–sectional dispersion of Current compensation is much lower. In 2006, the ratio of median absolute deviation to the median is 0.76 for Current compensation, against 6.04 for Deferred compensation. Another interesting finding, illustrated in Figure 4, is that most of the variation in Current compensation comes from the proceeds from trade in stock. In fact, the median absolute deviation for salary and bonus was only $270,000 (the median was $829,000). In light of this finding, the policy debate on the possibility of capping salary and/or bonuses appears to be misplaced.

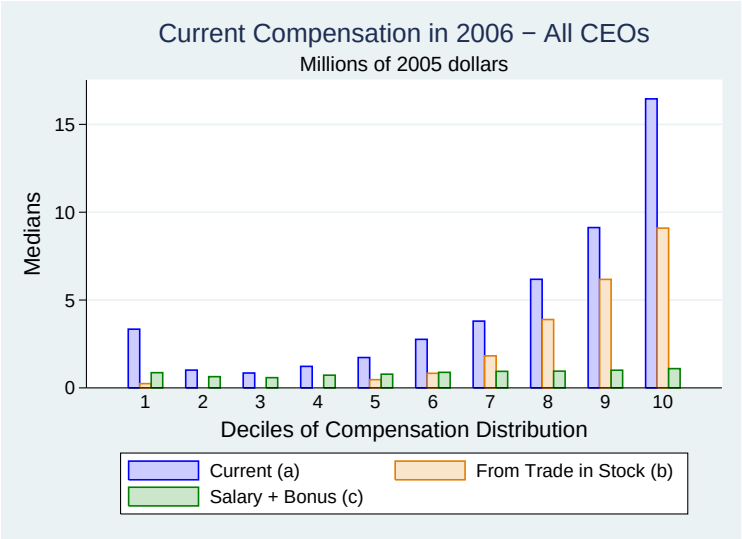

Figure 4: Current Compensation in the Cross–Section.

Bebchuk and Fried (2004) argued that "... much executive compensation comes in forms other than equity, such as salary and bonus." and that "The evidence indicates that cash compensation – including bonuses – has been at best weakly correlated with firms' industry adjusted performance."[11] The evidence presented in Section 7 is definitely in agreement with the latter statement. But, our data do not confirm the first part of this claim. For most CEOs, salary and bonus account for a rather small portion of total compensation. See Figures 3 and 4.

Table 10 illustrates compensation across professional CEOs. The distribution of Current compensation is remarkably similar to that for the entire population of CEOs. At the same

[11] See page 7, lines 1 through 4.

time, both the median and the median absolute deviation of total compensation are smaller in every single year. The main differences, however, are in the means. This should not come as a surprise. We defined non–professional CEOs as those who own large equity stakes in their companies. In turn, this implies that their total compensation will be particularly high in good times and particularly low in bad times. This immediately leads us to wonder whether the incentives faced by professional CEOs are as strong as previous analysis led us to believe. We will address this question in Section 7.

Finally, Table 11 illustrates the distribution of compensation across all non–CEO executives in our data-set. Both median and median absolute deviation are considerably lower. This is the result of lower levels of compensation in all categories, and in particular in those that are more sensitive to fluctuations in stock prices. At the margin, notice that all measures of compensation are particularly high in the top and bottom 5% of executives, because most company founders with no executive roles fall in these bins.

5 Compensation Variation in The Cross–Section of Firms

In this section we are interested in documenting how the various measures of compensation vary with firm size and across sectors.

Beginning with Kostiuk (1990), many have investigated the relationship between firm size and executive compensation. Kostiuk himself, Murphy (1999), Bebchuk and Grinstein (2005), and Gabaix and Landier (2008) among others, found evidence of a positive correlation between the two variables. Even in our dataset, the classical definition of compensation is unconditionally positively correlated with proxies for size such as sales and book value of assets. The question is whether a similar pattern holds for total compensation.

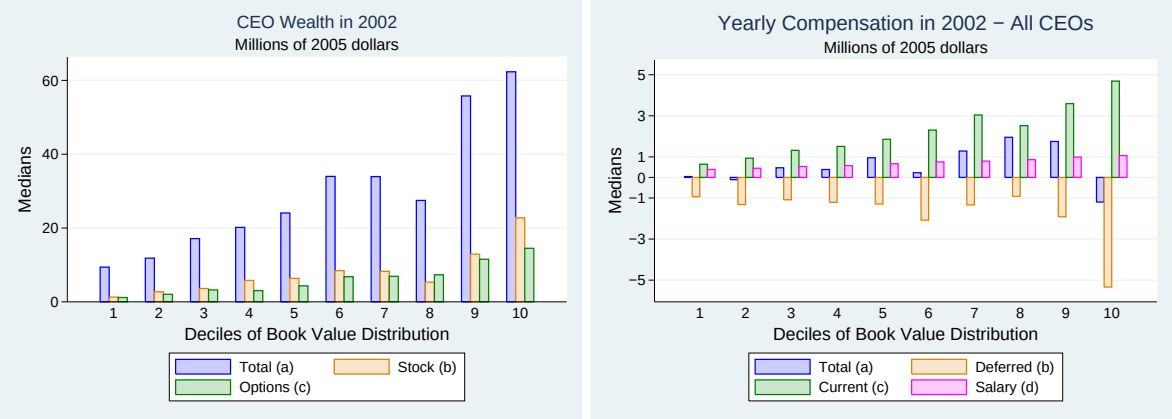

Figure 5: CEO Compensation and Firm Size.

Figure 5 depicts median CEO Wealth and Total Yearly Compensation for each decile in the distribution of book value of assets, in 2002. We have chosen 2002 because in that year mean compensation was largely negative.

The left panel tells us that, even in a year of relatively low stock prices, CEOs of larger firms had substantially larger wealth tied to the firms they led. In particular, they had larger stock and option holdings. This is why, as suggested by the right panel, the same CEOs suffered substantial losses.

Current compensation is also monotonically increasing in the size of the firm. Executives' salaries tend to be higher in larger firms, but the cross–sectional variation is minimal. Most of the variation in Current compensation is accounted for by differences in the net revenues from trade in stock.

The patterns just described do not change substantially when we adopt sales rather than book value as a measure of size.

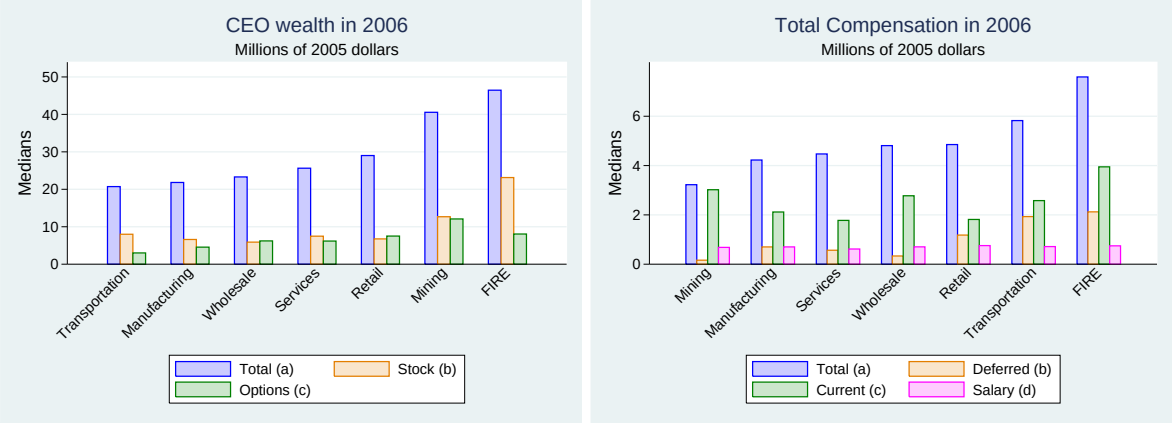

Figure 6: CEO Compensation across Sectors.

Figure 6 illustrates the variation of CEO wealth and compensation across sectors. Interestingly, CEOs in the Mining and Finance Insurance and Real Estate (FIRE) sectors stand out as holding larger wealth. Table 13 shows that for the FIRE sector this has been the case throughout the sample period. It is not clear whether this is due to the fact that CEOs in the FIRE sector manage larger firms. In fact, firms in the FIRE sectors tend to be larger when size is proxied by book value of assets, but not when we use either employment or sales.

6 Compensation Over Time

Echoing the popular and business press, a number of recent papers have argued that the *level* of executive compensation has increased dramatically over time. For example, Frydman and Saks (2006) state that "*The compensation of top executives increased by 6.8% per year from 1980 to 2003.*" Bebchuk and Grinstein (2005) find that "*Among S&P 500 firms, average CEO compensation climbed from* \$3.7 *million in 1993 to* \$9.1 *million in 2003 (an increase of 146%).*"

When considering the classical definition of compensation, our study delivers a similar message. Once again, given the skewness of the distribution, we will look at median values rather than means. The left panel of Figure 7 shows that the median compensation has doubled over the 14 sample–years. On average, this amounts to a growth rate which is about 4 times that of average non–farm hourly wages. Interestingly, median compensation has also increased in years in which most companies had rather poor financial results. This is the evidence invoked by those observers that argue that CEOs never lose, even when their companies' results are negative.

When we turn to our definition of compensation, the message is different. The right panel of Figure 7 illustrates the dynamics of real median compensation, both gross and net of the return on the market portfolio. Compensation has been quite variable over the sample years.

As expected, the gross measure tracked aggregate stock market returns. Median gross compensation was at its minimum of about 420,000 dollars in 2002, when the S&P500 index lost about 30% of its value. In that year, 656 out of the 1,448 continuing CEOs lost money. It reached its maximum of 8.56 millions in 2003, when the S&P500 gained about 21%. What is clear is that there is no discernible trend. In fact, in 2005 median gross compensation turned out to be about the same as ten years earlier.

Our net definition displays less time–series variation than gross compensation. Once again, however, we cannot discern any particular trend.

Let's now turn to the growth pattern of the various components of compensation. The left panel of Figure 7 shows that the Current portion has increased over most of the sample period, at a mean pace much faster than average non–farm hourly wages. The same graph suggests that the growth in salaries accounts for a small portion of the increase. Indeed, the salary of the median CEO has increased less than average wages in the non–farm sector.

It turns out that most of the post–1999 increase in Current compensation is accounted for by net proceeds from trade in stock, i.e. by options exercise and stock sale. This piece of evidence is consistent with other findings.

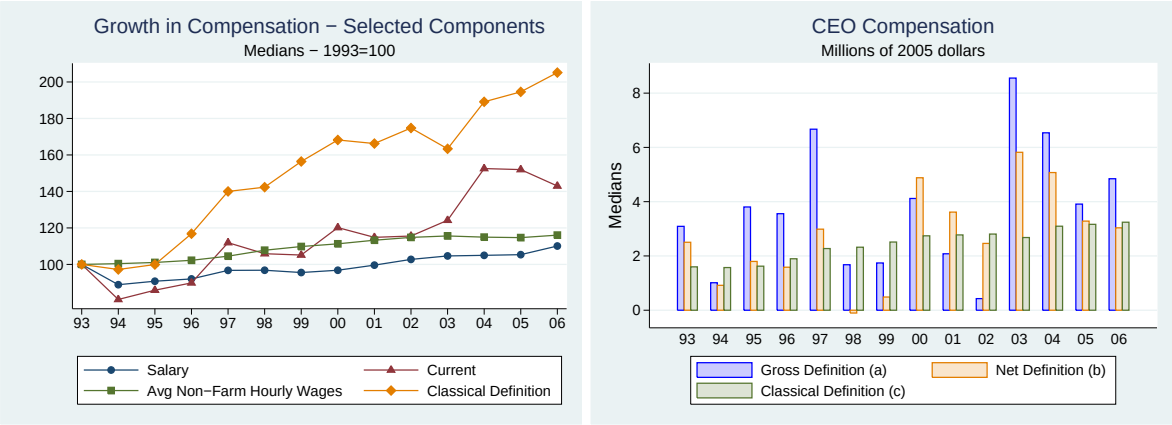

Figure 7: CEO Compensation over Time.

The right panel in Figure 8 shows that the median dollar value of securities grants has increased over pretty much the whole sample period. The pace of the increase was most notable until 2001. However (see left panel), median stock holdings actually declined from 1998 to 2003 (and picked up later on).

Let's assemble the various pieces of the puzzle. At the end of 1990s, we had increasing stock prices and security grants, but declines in the median value of both stock and option holdings. It appears that companies stepped up the grant of securities, perhaps with the purpose of sharpening incentives, but it looks like executives sold shares whenever they could.

Our confidence in this rationalization of the facts is enhanced by the evidence provided by Ofek and Yermack (2000), that (i) executives tend to immediately relinquish the shares obtained via options' exercise and that (ii) those among them that have higher equity stakes sell stock whenever they are granted new restricted shares or new options.

The right panel in Figure 8 points to a further change in compensation practices. The relative importance of stock and options has changed. Since 2001, stock grants have become more prominent, as companies scaled down the volume of option awards.

Hall and Murphy (2003) argued that the increase in option grants over the 1995–2001 period was prompted by revisions to the tax code enacted in 1994. According to the new rules, companies were allowed to deduct compensation expenses in excess of 1 million dollars, only when the compensation was performance–based. It would be interesting to understand what prompted companies to change their compensation practices after 2001 from using options to stock grants.

Changes in sectoral composition don't appear to be among the causes of this phenomenon. In fact the dynamics just described applies to both sectors whose relative importance shrank

Figure 8: Dynamics of Wealth and Securities Grants.

during the sample period – Paper and Allied Products (SIC 26) and Depository Institutions (60) – and those whose importance grew over time, such as Electronic Equipment (SIC 36), and Business Services (73).[12]

7 The Sensitivity of Compensation

Another important aspect of executive compensation is its sensitivity to changes in shareholder wealth. Scholars have assessed it in a variety of ways. Here we will consider three of them. The first, which we identify as JM–AS, measures the dollar increase in executive's wealth per $1,000 increase in shareholder wealth. The other two are the semi–elasticity and the elasticity of executive's wealth with respect to shareholder wealth, respectively.

The three definitions reflect different hypotheses about how shareholders and executives value risky prospects. For example, the first two definitions are valid only under the assumption that the prospect of losing a given dollar amount has the same impact on executives, no matter their wealth. The third is based on the postulate that what matters to executives is the percentage change in wealth.

[12]The two–digit SIC sectors that shrank the most in term of relative importance also include Printing and Publishing (27), Chemicals and Allied Products (28), Petroleum Refining (29), Leather and Leather Products (30), Primary Metal Industries (33), Transportation Equipment (37), Communications (48), Electric, Gas, and Sanitary Services (49), Food Stores (54), and Depository Institutions (60). Among the sectors that gained the most are Photographic, Medical, and Optical Goods (38), Insurance Carriers (63), and Holding And Other Investment Offices (67).

7.1 The JM–AS Sensitivity Measure

The acronym JM–AS refers to the contributions by Jensen and Murphy (1990) and Aggarwal and Samwick (1999). Having found that in their sample CEO wealth increased by only $3.25 for 1,000 dollar increase in shareholder wealth, Jensen and Murphy (1990) claimed that CEOs were paid like bureaucrats. Or, in other words, that they faced rather weak incentives.

Schaefer (1998) and Hall and Liebman (1998) showed that Jensen and Murphy (1990)'s estimate was low because their sample was biased towards large firms. Stock market capitalization fluctuates more for large firms than it does for small firms. This implies that the risk imposed on a CEO by a given pay–performance sensitivity tends to be larger, the larger the firm.

This motivates us to follow the lead of Aggarwal and Samwick (1999), and compute estimates of sensitivity at different levels of volatility.

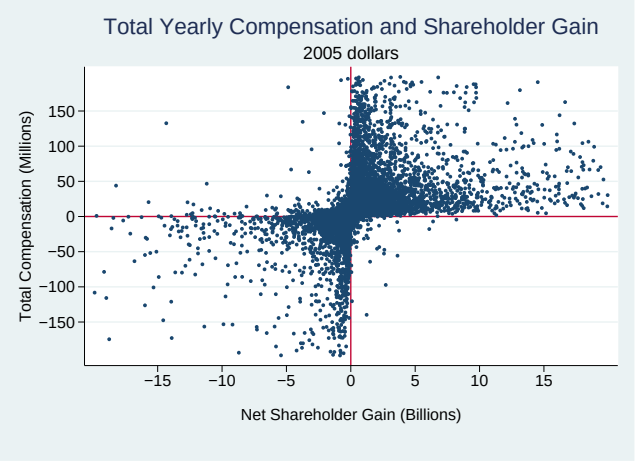

Figure 9: Compensation and Shareholder Gain.

The scatter plot in Figure 9 shows the association of changes in shareholder and executive's wealth over the sample period. While the unconditional correlation between the two variables is positive, there are many instances in which CEOs end up making money at the time in which their companies' market values drop by billions of dollars. These are the cases in the upper left quadrant and they are the ones that attract a lot of media attention.

As an example, consider the case of Douglas Ivester, the CEO of Coca–Cola Co. from October 1997 to February 2000. During the 1999 fiscal year, Coca–Cola's shareholders lost about 14%, or about 22.5 billion dollars. According to our calculations,[13] in the same year, Mr. Ivester made about 74 million dollars. As a result of the fall in the company's stock

[13] We reiterate that we do not have information about the actual stock sales by the executive. Our calculations are simply approximations, based on the information included in the Schedule 14A.

price, the value of his stock holding dropped. This explains why his Deferred compensation was negative (about –60.65 millions). However, his Current compensation was roughly $135 million, 91 of which came from the sale of company's stock.[14]

Following Aggarwal and Samwick (1999), we estimate the following equation:

$$w_{ijt} = \gamma_0 + \gamma_1 \Delta MKT\_CAP_{jt} + \gamma_2 \Delta MKT\_CAP_{jt} \times F(\sigma_j) + \gamma_3 F(\sigma_j) + \lambda_t + \varepsilon_{it}, \qquad (1)$$

where i, j, t index the executive, the firm, and time, respectively. The letter w denotes compensation, MKT_CAP_{jt} is total market capitalization, Δ is the one–period lag operator, and λ_t is a year dummy whose purpose is to control for aggregate shocks. Finally, σ_{jt} denotes the standard deviation in shareholders' dollar return (i.e. the change in market capitalization). $F(\cdot)$ is the cumulative distribution of standard deviations. The interaction term $\Delta MKT\_CAP_{jt} \times F(\sigma_j)$ was introduced because the impact on compensation of a $1,000$ dollar change in shareholder wealth is expected to be larger, the smaller the average change in capitalization. The measure of sensitivity for company j in year t will be $\gamma_1 + \gamma_2 \times F(\sigma_{jt})$. Our estimates are reported in Table 1.

Table 1: Median Regression Estimates of Pay–Performance Sensitivities

	All Executives			All CEOs			Professional CEOs		
Dependent Variables:	Total	Current	Deferred	Total	Current	Deferred	Total	Current	Deferred
Shareholder_Gain	6.803	0.686	0.966	34.630	2.015	28.868	21.317	1.475	17.522
	(0.017)	(0.008)	(0.012)	(0.149)	(0.060)	(0.139)	(0.133)	(0.056)	(0.090)
Sh_Gain × Variance_distrib	-6.366	-0.679	-0.574	-32.704	-1.961	-27.214	-19.744	-1.414	-16.208
	(0.017)	(0.008)	(0.012)	(0.151)	(0.061)	(0.141)	(0.136)	(0.057)	(0.092)
Variance_distrib	2,072.019	1,250.416	-955.392	3,471.623	3,710.679	-1,331.193	3,891.368	3,483.049	-525.600
	(16.827)	(8.213)	(11.706)	(146.512)	(59.542)	(137.043)	(136.235)	(57.582)	(92.073)
Number of observations	103,113	105,103	103,113	16,953	17,182	16,953	11,357	11,489	11,357
Pseudo R^2	0.049	0.020	0.033	0.077	0.022	0.063	0.219	0.061	0.174

Note: Standard errors in parenthesis.

In the case of CEOs, a $1,000$ dollar increase in capitalization induces a $34.63 dollar increase in compensation for the firm with the lowest volatility and a $1.93 dollar increase for the firm with the highest. These estimates are substantially larger than those obtained by Aggarwal and Samwick (1999) for the period 1993–1996. When we restrict attention to that period, we find that the sensitivity of the lowest–variance firm is $25.60, slightly smaller than the value reported by Aggarwal and Samwick (1999) ($27.596).

What explains the increase in the JM–AS measure? Can it simply be the result of a decrease in the volatility of shareholder value?

Let's think first of systematic volatility. Garvey and Milbourn (2003) argue that if executives hedge systematic risk, then the magnitude of the JM–AS measure should only vary with

[14]The remainder of Mr. Ivester's Current compensation in 1999 consisted of 1.5 millions in salary, and in about 20 millions in both the EXECUCOMP variables ALLOTHPD and OTHANN.

the idiosyncratic portion of the volatility of shareholder's wealth. They provide evidence that this is indeed the case between 1992 and 1998. We followed their methodology and retrieved measures of systematic and idiosyncratic volatility by means of simple CAPM regressions. Then, we modified equation (1) by replacing the c.d.f. of firm volatility with the distributions of systematic and idiosyncratic volatility.

Our results are reported in Table 14. The bottom line is that the relationship between the sensitivity measure and volatility is accounted for almost completely by the idiosyncratic portion of the latter. This also means that changes in systematic volatility are not likely to rationalize the increase in the sensitivity measure we have documented.

How about changes in idiosyncratic risk? Brandt, Brav, and Kumar (2009) found that the idiosyncratic volatility of percent returns declined over the 1997–2007 period. Obviously, this may matter. There are at least two reasons, however, why this may not be the whole story. First of all, the volatility of shareholder wealth also depends on market valuation, which has increased over the period in exam. Furthermore, Brandt, Brav, and Kumar (2009) argue that most of the decline in volatility applied to a subset of stocks (low price stocks, held proportionally more by retail investors). This means that the decline in volatility may have a sizeable impact on OLS estimates, but should have a more limited effect on median estimates.

The results reported so far suggest that the increase in performance–based compensation may have led to stronger incentives. The next two sections will tell us whether our other measures of pay–performance sensitivity yield a consistent picture.

Table 2: Sensitivity at different levels of volatility – Professional CEOs

	Total	Current	Deferred
Lowest Variance	21.317	1.475	17.522
Median Variance	11.445	0.768	9.418
Largest Variance	1.573	0.061	1.314

Table 1 also reports our sensitivity estimates for all the executives and for the group of professional CEOs, respectively. As expected, the estimates for non–CEO executives are much lower than reported above for CEOs. The picture that emerges for professional CEOs is more interesting. On the one hand, the sensitivity of Current compensation is about the same as for the totality of CEOs. On the other hand, we find that the deferred component responds much less to fluctuations in shareholder value. This is obviously due to the lower stockholding.

To determine whether the JM–AS sensitivity varies across sectors, we interact the variable

ΔMKT_CAP_{jt} with sector–specific dummies. We estimate the equation

$$w_{ijt} = \gamma_0 + \gamma_1 \Delta MKT\_CAP_{jt} \times \psi_s + \gamma_2 \Delta MKT\_CAP_{jt} \times F(\sigma_j) + \gamma_3 F(\sigma_j) + \varepsilon_{it},$$

where ψ_s equals 1 if the firm j belongs to sector s and equals 0 otherwise. Table 3 reports our estimates of the sensitivity for lowest–volatility firms. The parameter γ_1 is estimated to be -18.573. There appears to be limited variation across sectors.

Table 3: JM–AS Sensitivity Coefficients by Sector – Professional CEOs

Mining	Construction	Manufacturing	Transportation	Wholesale	Retail	FIRE	Services
20.678	23.426	19.863	19.214	19.332	20.327	20.979	22.698

Next, we follow Core and Guay (2002) and Cichello (2005) among others, and investigate whether firm size per–se has any effect on pay–performance sensitivity. To this end, we augment equation (1) by interacting the gain in shareholder wealth with the c.d.f. of sales (lagged one period). Our estimates are displayed in Table 15. As in the previous literature, we find that firm size does matter. That is, even conditioning on the standard deviation of shareholders' dollar return, the sensitivity is negatively associated to size. Our findings do not change qualitatively when we proxy size with book value of assets.

We conclude this section by outlining a few basic issues that cast some doubts on the reliability of these estimates and that have gone unremarked in earlier studies. We start by observing that the decision to use the c.d.f. of the standard deviation, rather than the standard deviation itself is not innocuous. It amounts to a concave transformation that lowers the impact of relatively large observations and therefore increases the magnitude of the estimates.

A second issue has to do with the fit of the model. With the exception of professional CEOs, the Pseudo R^2 are very low, suggesting that the linear model model accounts for a rather small fraction of the total variance.

Finally, we notice that the correlation between ΔMKT_CAP_{jt} and its interaction with $F(\sigma_j)$ is always larger than 0.99. This is a even bigger issue when we include in the regression the c.d.f. of sales or other proxies for firm size. In those scenarios, the regressor $\Delta MKT\_CAP_{jt} \times F(size_j)$ is also very highly correlated with the other two. However, in spite of the multicollinearity, the large size of the sample ensures that the estimates are stable and appear to be statistically significant. These are serious issues.

7.2 The Semi–Elasticity of Compensation with Respect to Shareholder Wealth

The semi–elasticity measures the dollar increase in executive's wealth associated with a 1% increase in shareholder wealth. We estimate the following equation:

$$w_{ijt} = \gamma_0 + \gamma_1 Sh\_\%Gain_{jt} + \gamma_2 Sh\_\%Gain_{jt} \times F(\sigma_j) + \gamma_3 F(\sigma_j) + \lambda_t + \varepsilon_{it}, \qquad (2)$$

where $Sh\_\%Gain_{jt}$ is the percentage gain of firm j's shareholders over the fiscal year t. Here σ_{jt} represents the standard deviation of shareholder percent return. $F(\cdot)$ is the c.d.f of the standard deviation.

Our estimate of the expected dollar increase in total yearly compensation associated with a 1% increase in shareholder return is $\gamma_1 + \gamma_2 \times F(\sigma_{jt})$. The results are listed in Table 4.

Table 4: Semi–elasticity Estimates

	All CEOs	Professional CEOs
Dependent Variables		
Shareholder Return	368.739	265.708
	(4.444)	(3.596)
Sh_Ret × Variance_distrib	-228.716	-202.888
	(5.780)	(4.822)
Variance_distrib	278.012	-617.408
	(254.988)	(222.393)
No. Observations	16,953	11,357
Pseudo R^2	0.043	0.092

Note: Standard errors in parenthesis.

In the previous Section, we showed that our JM–AS sensitivity estimates over the 1993–2006 are larger than those obtained by Aggarwal and Samwick (1999) for the 1993–1996 period. Similarly, the estimates reported in Table 4 are larger than those that we obtain by running the same regression over data for the earlier period. When we discard post–1996 data, the coefficients of *shareholder return* are 237.61 and 186.56 for CEOs and professional CEOs, respectively.

Hall and Liebman (1998) simply regressed dollar compensation on a constant and shareholder return. When we do the same (running robust regressions as they did), we obtain that a 1% increase in return was associated on average with a 195,000 dollar increase in compensation, an estimate considerably larger than the 43,000 dollars reported by Hall and Liebman (1998) for the period 1980–1994.

In order to determine whether the semi–elasticity varies across sectors, we proceed to interact the variable $Sh\_\%Gain_{jt}$ with sector–specific dummies, as we did in the previous

section. The estimate of γ_2 is -183.137. Table 5 reports our estimates of the sensitivity for lowest–volatility firms.

Table 5: Semi–elasticities by Sector – Professional CEOs

Mining	Construction	Manufacturing	Transportation	Wholesale	Retail	FIRE	Services
215.850	230.859	252.287	201.615	191.395	268.963	365.961	291.699

The FIRE sector stands out as the one displaying the highest sensitivity. However, digging a little deeper reveals that the differences are not as large as Table 5 may lead one to believe. The point, very simply, is that the FIRE sector has a relatively large fraction of low–volatility firms.

To see that this is indeed the case, consider Figure 10, which plots the frequency distribution of estimated sensitivities by sector. That is, the frequency distribution of $\gamma_1 + \gamma_2 \times F(\sigma_{jt})$. The middle panel on the top row shows that the FIRE sectors has a large portion of firms with low volatility. This is in part responsible for the large estimate we obtain for that sector.

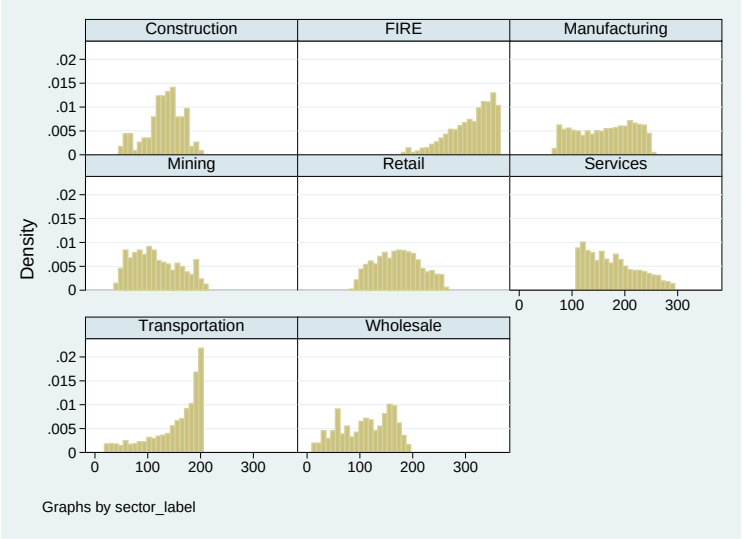

Figure 10: Distribution of sensitivity estimates.

7.3 The Elasticity of Executive's Wealth With Respect to Shareholder Wealth

The elasticity measures the percentage change in the portion of executive's wealth tied to the firm which is associated with a 1% increase in market capitalization. Since typically non–CEOs executives have little wealth invested in the companies they work for, we focus on

CEOs. The equation we estimate is

$$CEO\_\%Gain_{ijt} = \gamma_0 + \gamma_1 Sh\_\%Gain_{jt} + \lambda_t + \varepsilon_{it}, \tag{3}$$

where $CEO\_\%Gain_{ijt}$ denotes the percentage increase in the wealth of CEO i in year t. Our results are listed in Table 6.

Table 6: Elasticity Estimates

	All CEOs	Professional CEOs
Dependent Variables		
Shareholder Return	1.175	1.304
	(0.006)	(0.011)
Constant	0.218	0.326
	(0.015)	(0.026)
No. Observations	19,146	12,810
Pseudo R^2	0.318	0.279

Note: Standard errors in parenthesis.

At the median, the percentage increase in CEO wealth associated with a 1% increase in shareholder wealth is 1.17 for the totality of CEOs and 1.3 for professional CEOs. The likely reason for this difference is that professional CEOs tend to have less wealth invested in their companies.

Unlike the JM–AS measure and the semi–elasticity, our estimates of the elasticity are stable over the sample period. For the sake of consistency, let's consider the 1993–96 period. The point estimate for the CEOs is the same as in Table 6. The elasticity for professional CEOs was 1.25 in the earlier period as opposed to 1.3 – different but not hugely so.

In light of the increase in shareholder wealth that occurred after 1996, the time variation of our elasticity estimates is not inconsistent with the results obtained for the other two sensitivity measures. According to Table 13, median CEO wealth was *only* \$16.13 million in 1993 and grew to \$19.29 million in 1996. In 2006, it had risen to 26.75 million, about 39% higher. These figures lead to two possible rationalizations of the evidence.

It may be the case that what matters to executives is really the percentage fluctuations in their wealth. If this is the case, the increase in the JM–AS and semi–elasticity measures were needed in order to maintain incentives (i.e. the elasticity) intact in the face of an increase in shareholder wealth.

Alternatively, it may be dollar changes that matter. If so, the increase in the dollar volatility of compensation would reflect a strengthening of incentives. The increase in CEO

wealth may have been necessary in order to retain CEOs in the faceof the higher risk they are called to bear.

When we investigate the cross–sectoral variation in elasticity, we find that it varies from about 1.25 for Construction and FIRE to 1.53 for Transportation. See Table 7.

Table 7: Elasticities by Sector – Professional CEOs

Mining	Construction	Manufacturing	Transportation	Wholesale	Retail	FIRE	Services
1.466	1.239	1.343	1.535	1.409	1.266	1.256	1.287

8 Conclusion

The compensation of executives of public corporations is a compelling issue with strong political overtones. It is compelling because economic theory tells us a lot about how to structure contracts to align the goals of professional managers with those of the shareholders. And yet, there is a popular perception that this is not working and that incentives are weak. Much of this perception is based on a set of "facts" that are not completely reflective of reality.

When one looks at compensation and its components in detail, a number of features stand out. To start with, the distribution of total compensation is highly skewed so averages are highly misleading. The dispersion of the cross–sectional distribution is also remarkable. In every single year, a large fraction of CEOs lose money. Sometimes, they lose a lot.

Over the sample period, the use of security grants has increased. However, this has not led to a one for one increase in the portion of executives' wealth that is tied to their companies. In fact, revenues from the sale of stock have also increased.

No matter how we measure it, the sensitivity of pay to performance is substantial. However, whether the sensitivity has increased or not, crucially depends on the proxy we use. If one believes that what matters to executives is changes in the level of compensation, then the conclusion is that incentives are now stronger then they used to be. Instead, if what really matters is percentage changes in wealth, then we are led to conclude that incentives did not change over time.

A Definitions of CEO Wealth and Total Yearly Compensation

As stated in the main body of the paper, our definition of Executive's Wealth proxyes for the dollar value of the executive's wealth that is tied to the firm at the beginning of the year. It is defined as the sum of the following elements:

1. Market Value of Stock – SHROWN×PRCCF, where SHROWN is the number of shares owned at the end of the previous fiscal year and PRCCF is the share price at the same date
2. Market Value of Stock Options – INMONEX+INMONUN, where INMONEX is the value of exercisable in–the–money options and INMONUN is the value of unexercisable in–the–money options
3. Salary
4. Bonus
5. Total value of Restricted Stock Granted – RSTKGRNT
6. Total value of Stock Options Granted – SOPTVAL
7. Expected Discounted Value of Future Cash Payments – See Appendix A.3 below

Total Yearly Compensation is our best estimate of the net increase in executive's wealth that occurred during the fiscal year, due to her relation with the company. It is defined as the sum of the following elements:

1. Salary
2. Bonus
3. Net revenue from Trade in Stock – See Appendix A.2 below
4. Dividends
5. Long–Term Incentive Payouts – ALLOTHTOT-ALLOTHPD
6. A miscellanea of items, among which payouts for cancellation of stock options, payment for unused vacation, tax reimbursements, and signing bonuses – ALLOTHPD+OTHANN
7. Yearly change in the Market Value of Stock

8. Yearly change in the Market Value of Options

The first six elements define what we call Current Compensation. The sum of the remaining ones identify Deferred Compensation.

A.1 The Value of Option Holdings according to the HH Algorithm

The analysis carried out in the main body of the paper posits that the change in the value of the executive's option holdings equals the year–on–year change in the sum of un-exercisable and in–the–money options, both computed at the money at the end of the fiscal year. This is strategy followed by most other studies, among which Aggarwal and Samwick (1999).

In this section we describe the algorithm devised by Himmelberg and Hubbard (2000) in order to estimate the value of out–of–the–money options in executives' portfolios. The algorithm makes use of the following EXECUCOMP variables:[15]

- UEXNUMEX = number or un-exercised but exercisable options held by the executive at year–end, both in–the–money and out–of–the–money
- UEXNUMUN = number of un-exercisable un-exercised options held by the executive at year–end, both in–the–money and out–of–the–money
- SOPTEXSH = number of options exercised by the executive during the fiscal year
- SOPTGRN = total number of stock options awarded during the fiscal year
- SOPTVAL = total value of options granted during the fiscal year

Under the assumption that none of the options awarded in a given year are immediately exercisable, the total value of options at year–end is the sum of (i) the value of newly granted options (SOPTVAL), (ii) the value of un–exercisable options (in number $UEXNUMUN_t - SOPTGRN_t$), and (iii) the value of exercisable options (in number $UEXNUMEX_t$).

Unfortunately we lack data on strike prices and vesting horizons of the options in portfolio. Therefore we assume that (i) a stock option grant vests gradually over four years, at a constant rate and (ii) SOPTEXSH includes the options that are let expire. It follows that the laws of

[15] Some of the variables have changed labels in the latest version of the EXECUCOMP dataset. UEXNUMEX is now called OPT_UNEX_EXER_NUM. UEXNUMUN is OPT_UNEX_UNEXER_NUM. OPTION_EXER_NUM. SOPTEXSH is OPTION_EXER_NUM. SOPTGRNT is OPTION_AWARDS_NUM. Finally, OPTION_AWARDS_RPT_VALUE coincides with SOPTVAL. However, the latest version of the dataset uses OPTION_AWARDS_FV for those records that follow the new FASB123 reporting requirements.

motion for the stocks of un–exercisable and exercisable options are

$$UEXNUMUN_t = (1 - 0.25)UEXNUMUN_{t-1} + SOPTGRNT_t$$
$$UEXNUMEX_t = 0.25 \times UEXNUMUN_{t-1} + UEXNUMEX_{t-1} - SOPTEXSH_t.$$

Then, we compute the value of the executive's option portfolio to be

$$opvt_t = SOPTVAL_t + UEXNUMEX_t \times bsvex_t + [0.75 \times UEXNUMUN_{t-1}] \times bsvun_t. \quad (4)$$

The second addendum is the value of the exercisable options. The third addendum is the value of un-exercisable options inherited from the past.[16] We need to determine $UEXNUMUN_{t-1}$. Without it, we would have to discard one more observation for every executive–firm match. The above conditions imply that

$$UEXNUMUN_{t-1} = [UEXNUMUN_t - SOPTGRNT_t]/0.75$$
$$UEXNUMEX_{t-1} = UEXNUMEX_t + SOPTEXSH_t - 0.25 \times UEXNUMUN_{t-1}.$$

Notice that, implicit in this formulation, is the fact that $UEXNUMEX_t$ and $UEXNUMUN_{t-1}$ are computed at some average price, in spite of the fact that they have different maturities (and therefore different risk–free rates) and different strike prices.

A.1.1 Option Pricing

Options awarded to executives are American options on dividend–paying securities. Since there is no closed form pricing formula for them, we will use the Black–Scholes formula for European options with continuous payment of the underlying:

$$Se^{-qT}N(d1) - Xe^{-rT}N(d2),$$

where

$$d1 = \frac{\log \frac{S}{X} + (r - q + \frac{1}{2}\sigma^2)T}{\sigma\sqrt{T}} \; ; \quad d2 = d1 - \sigma\sqrt{T}.$$

It is left to specify how we determine the volatility of stock returns σ, the dividend yield q, the risk–free rate r, and the strike prices.

- EXECUCOMP provides data for σ in the variable BS_VOLAT. Since it has many missing observation, we computed our own measure, based on CRSP data. If p_t is stock price and d_t is dividend, the return is computed as $\log \frac{p_t + d_t}{adj \times p_{t-1}}$. The factor adj is equal to $CFACSHR_t / CFACSHR_{t-1}$.

[16] Notice that stock splits imply a slight modification to this formula. See Appendix A.1.1 below.

- EXECUCOMP provides data for q in the variable BS_YIELD. Since it has many missing observation, we computed our own measure, based on CRSP data. That is, $q = \log(1 + d/p)$.
- Risk–free rates come from FRED at the St. Louis Fed. We use monthly data, as I follow the convention that we evaluate everything at the end of the fiscal year – not the calendar year. The series are GS3 and GS5 (Monthly returns on 3– and 5–year Treasuries – Constant Maturity).
- Following Himmelberg and Hubbard (2000) once again, we assume that
  - out of the exercisable options ($UEXNUMEX_t$), 10% are 1–year old, 30% are 2–year old, and 60% are 3–year old. This implies a strike price for the representative option of $.1p_{t-1} + .3p_{t-2} + .6p_{t-3}$. The average maturity is assumed to be 3 years
  - out of the un-exercisable options ($UEXNUMUN_{t-1}$), 60% are 1–year old, 30% are 2–year old, and 10% are 3–year old. This implies a strike price for the representative option of $.6p_{t-1} + .3p_{t-2} + .1p_{t-3}$. The average maturity is assumed to be 5 years.

One last caveat about stock splits. When evaluating options, we need to exercise some care in order to make sure that strike prices and current prices are comparable. We decide to use the market price for current price and adjust the strike prices and the number of options for splits.

If the split is Z shares per each owned (in terms of EXECU variables, $Z = AJEX_{t-1}/AJEX_t$), we need to introduce only two minor alterations: (i) the strike price is by Z and (ii) the equation (4) becomes

$$opvt_t = BLKVALUE_t + UEXNUMEX_t \times bsvex_t + [0.75 \times Z \times UEXNUMUN_{t-1}] \times bsvun_t.$$

A.2 Computation of the net revenue from trade in stock

In this appendix, we briefly describe the algorithm we employ to estimate the net revenue from trade in stock. We start by estimating the cost of exercising options, i.e. VEX_t. We postulate that all options exercised had the same strike price and were exercised when the stock price was the maximum for the fiscal year. This amounts to assuming that the following relationship holds:

$$SOPTEXER = [MAX\_PRICE - STRIKE] \times SOPTEXSH,$$

where MAX_PRICE is the maximum price for the fiscal year and the EXECUCOMP variables SOPTEXER and SOPTEXESH are the net value realized from exercising options and

the number of options exercised, respectively.[17] $STRIKE$ is our unknown, the estimated strike price for the options exercised during the year.[18] Then CEX_t, the cost of exercising the options, is given by

$$CEX_t = SOPTEXSH_t \times STRIKE_t.$$

Next, we estimate the net number of shares sold. EXECUCOMP provides us with the holdings of restricted stock, RSTKHLD. The restricted stock granted $GRNT_t$ can be estimated by dividing the value of restricted stock granted by the price at the end of the fiscal year: $GRNT_t = RSTKGRNT/PRCCF$. The law of motion for restricted stock allows us to recover the number of vested shares $VEST_t$.

$$RSTKHLD_t = RSTKHLD_{t-1} + GRNT_t - VEST_t.$$

Abstracting from donations, the law of motion for common stock $SHROWN_t$ is given by

$$SHROWN_t = SHROWN_{t-1} + P_t + VEST_t - S_t + SOPTEXSH_t,$$

where P_t and S_t denote the stock purchased and sold, respectively. Our estimate of the net number of shares sold is

$$S_t - P_t = SHROWN_{t-1} - SHROWN_t + VEST_t + SOPTEXSH_t.$$

If $P_t - S_t > 0$, we assume that the net revenue from stock trade is identically zero. If $S_t - P_t > 0$, we assume that the net revenue from stock trade is $\max[0, AVG\_PRICE \times (S_t - P_t) - CEX_t]$. That is, we assume that the executive sold $S_t - P_t$ shares at the average market price for the year, but we impose that the net revenue is always non–negative.

A.3 Expected Discounted Value of Future Cash Payments

Estimating the expected discounted value of future cash payments is extremely challenging, as it entails (i) projecting the evolution of expected cash payments over time, (ii) estimating the conditional expectation of years left in office, and (iii) conjecture a discount rate.

The evidence shown in the main body of the paper indicates that the sum of salaries and bonuses has increased very little over our sample period. For this reason, we do not feel particularly uncomfortable assuming that such payments are expected to stay constant at the current value, in real terms.

[17] Notice that from the database it is not possible to tell whether the stock the executive acquires by exercising options was sold or held on to.

[18] According to the EXECUCOMP manual, SOPTEXER is computed using the price of the day of the exercise. This implies that our procedure over–estimates the strike price. Alternatively, we may assume that the option was exercised when the stock price was equal to the average for the fiscal year.

We find that in our sample the hazard rate varies very little for the first ten years in office. For this reason, we make the drastic choice of assuming that the hazard rate is constant at its sample mean of 0.1156. This figure implies that the expected number of years in charge after the current one, is constant and equal to about 7 and a half. It is clear that this assumption is going to bias our estimates upwards. Finally, we assume that the discount factor is 0.9615, the value commonly used in the macroeconomics literature.

Let ρ be the survival rate (1 minus the hazard rate) and let β be the discount factor. Given our assumptions, the expected discounted value of future cash payments is estimated to equal payments in the current year, multiplied by the following factor:

$$(1-\rho)\sum_{t=1}^{\infty}\rho^t\sum_{s=1}^{t}\beta^s = \frac{\rho\beta}{1-\rho\beta}.$$

B More Details on the Data

Effects of FAS 123. The Securities and Exchange Commission (SEC) has mandated all public companies registrants that are not small business filers to apply Statement 123R by the Financial Accounting Standards Board (FASB), as of the start of their first annual period beginning after June 15, 2005. FAS 123R prescribes that equity based compensation has to be expensed and be reflected in the financial statements based on fair value of the awards. This policy change had a minor effect on the definitions of EXECUCOMP's variables. The conventions adopted in order to bridge variables whose definitions have changed, are available from the authors upon request.

Dating Convention. All compensation data refers to the date of the annual shareholder meeting, which is held within three months of the end of the fiscal year. We don't have information about meetings' dates. Therefore we assume that the information refers to the last day of the fiscal year.

Market Return. Our proxy for market return is the variable VWRETD from CRSP, the Center for Research in Security Prices at the Booth School of Business. VWRETD is the value–weighted return (with dividends) on an index drawn from the combined NYSE/AMEX and NASDAQ data.

Volatility of Dollar Returns. When computing the JM–AS measure of pay–performance sensitivity in Section 7, we include among the regressors the (c.d.f. of the) volatility of dollar return to shareholders. We follow Aggarwal and Samwick (1999) (see page 76 of their paper) and define volatility in a given month as the standard deviation of the monthly total returns to shareholders over the 60 previous months.

Idiosyncratic Volatility of Dollar Returns. We compute idiosyncratic and systematic volatility following the methodology described in Garvey and Milbourn (2003). For every month, we run simple CAPM regressions over the preceding 60 month. Systematic volatility is equal to the portion of return volatility that is explained by the model, multiplied by market capitalization. Idiosyncratic volatility is the portion of return volatility not explained by the model, multiplied by market capitalization.

Inflation Adjustment. All dollar–denominated variables in EXECUCOMP are reported in current prices. We transformed them in constant (2005) prices, dividing them by the chain–weighted CPI (All Urban Consumers, US City Average, All Items) from the Bureau of Labor Statistics.

Wages. Average non–farm hourly wages is the series produced by the Bureau of Labor Statistics bearing the same name, deflated by the CPI.

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Table 8: Distribution of Total Compensation – Millions of 2005 dollars – All CEOs

Year	Obs.		Mean	Median	MAD	Skewness	Means by Decile									
							1	2	3	4	5	6	7	8	9	10
1993	715	Gross	21.57	3.09	2.95	11.50	-59.15	-0.20	0.82	1.50	2.42	3.98	5.96	10.12	21.05	230.30
		Net of Mkt	14.98	2.50	3.03	10.06	-80.57	-1.45	0.47	1.13	1.97	3.27	5.14	8.77	17.81	193.83
		Classical	2.55	1.60	0.82	5.21	0.42	0.72	0.94	1.19	1.44	1.81	2.27	2.91	4.07	9.76
1994	1,334	Gross	5.46	1.01	2.34	17.45	-46.18	-4.25	-0.75	0.31	0.74	1.37	2.28	4.00	8.04	89.28
		Net of Mkt	4.60	0.92	2.39	18.92	-47.77	-4.58	-0.94	0.26	0.69	1.26	2.14	3.85	7.63	83.75
		Classical	2.67	1.57	0.87	4.69	0.38	0.64	0.85	1.13	1.41	1.78	2.25	3.05	4.38	10.90
1995	1,401	Gross	30.70	3.81	3.71	20.95	-13.62	-0.18	0.85	1.69	2.92	4.83	7.67	13.24	24.85	265.00
		Net of Mkt	14.29	1.80	3.72	19.85	-47.67	-5.32	-0.49	0.58	1.30	2.50	4.38	7.87	15.05	165.40
		Classical	2.79	1.62	0.88	8.50	0.39	0.68	0.90	1.14	1.45	1.83	2.33	3.17	4.67	11.33
1996	1,439	Gross	24.15	3.56	3.91	19.69	-24.86	-0.64	0.72	1.51	2.76	4.51	7.54	12.14	23.54	215.43
		Net of Mkt	7.67	1.58	4.03	-0.84	-79.48	-5.19	-0.76	0.52	1.22	2.33	4.43	7.88	15.35	130.58
		Classical	3.71	1.90	1.11	16.62	0.41	0.72	1.01	1.30	1.70	2.16	2.82	3.91	5.93	17.16
1997	1,432	Gross	53.70	6.67	6.41	29.18	-41.76	0.15	1.45	3.02	5.23	8.35	13.28	22.08	41.05	484.88
		Net of Mkt	23.89	2.99	5.74	26.14	-111.43	-5.82	-0.61	0.86	2.08	4.01	6.96	12.71	24.05	306.69
		Classical	4.51	2.27	1.38	8.71	0.45	0.81	1.15	1.52	1.98	2.55	3.33	4.64	6.93	21.79
1998	1,438	Gross	70.15	1.68	6.42	23.40	-65.21	-7.54	-2.26	-0.03	1.06	2.56	5.76	12.94	34.93	723.01
		Net of Mkt	34.31	-0.10	7.29	23.38	-129.31	-19.09	-8.74	-3.77	-0.92	0.43	1.77	5.81	19.56	478.71
		Classical	5.30	2.32	1.41	28.30	0.43	0.85	1.19	1.59	2.05	2.66	3.57	4.97	7.59	28.18
1999	1,485	Gross	98.45	1.74	6.64	24.95	-177.03	-8.35	-2.18	0.14	1.11	2.67	6.57	14.45	37.96	1,112.32
		Net of Mkt	66.58	0.49	7.75	23.60	-281.30	-18.04	-6.73	-1.98	0.02	1.05	3.34	9.43	27.55	932.43
		Classical	5.87	2.51	1.58	8.57	0.43	0.89	1.24	1.66	2.21	2.92	4.01	5.81	9.12	30.58
2000	1,430	Gross	-12.38	4.12	8.39	-29.32	-525.47	-8.15	-0.65	1.05	2.89	5.87	10.85	20.81	46.95	322.08
		Net of Mkt	1.89	4.88	8.69	-23.27	-451.67	-5.73	-0.04	1.45	3.51	6.79	12.85	23.49	52.01	375.98
		Classical	7.47	2.74	1.84	16.19	0.41	0.84	1.25	1.70	2.29	3.16	4.38	6.12	10.43	44.22
2001	1,396	Gross	-2.00	2.08	6.26	14.37	-339.37	-12.21	-2.17	0.47	1.52	3.02	5.82	10.69	20.87	291.31
		Net of Mkt	23.09	3.62	6.01	20.34	-218.16	-5.33	0.15	1.47	2.76	4.99	8.51	14.90	29.31	393.06
		Classical	6.93	2.78	1.94	12.95	0.42	0.84	1.25	1.73	2.38	3.31	4.74	6.95	11.49	36.32
2002	1,448	Gross	-20.90	0.43	4.81	-24.79	-336.86	-15.63	-5.42	-1.55	0.02	0.91	2.32	4.71	9.92	131.62
		Net of Mkt	12.12	2.46	4.79	-11.11	-173.41	-4.71	-0.47	0.74	1.83	3.26	5.82	10.58	20.55	257.30
		Classical	5.26	2.81	1.83	5.52	0.45	0.90	1.30	1.79	2.43	3.25	4.41	6.10	9.43	22.55
2003	1,522	Gross	35.02	8.56	7.14	13.17	-28.12	1.37	2.94	4.82	7.18	10.66	15.53	24.53	44.57	267.06
		Net of Mkt	12.63	5.82	5.42	-14.61	-95.12	0.07	1.42	2.79	4.58	7.05	10.70	16.96	31.42	146.65
		Classical	4.83	2.68	1.67	3.86	0.46	0.90	1.30	1.79	2.33	3.07	4.02	5.69	8.56	20.17
2004	1,517	Gross	28.85	6.54	6.51	13.48	-36.84	-0.70	1.39	2.90	5.10	8.01	12.03	18.55	32.99	246.01
		Net of Mkt	19.19	5.07	6.00	11.40	-57.45	-2.13	0.70	2.14	3.88	6.50	10.03	15.55	27.26	185.79
		Classical	5.31	3.10	1.96	5.71	0.50	1.01	1.55	2.09	2.74	3.56	4.70	6.27	9.37	21.36
2005	1,529	Gross	18.47	3.91	5.07	11.67	-45.81	-2.91	0.28	1.40	2.95	4.98	8.05	14.15	27.00	175.34
		Net of Mkt	14.32	3.28	5.05	6.30	-64.34	-4.19	-0.09	1.05	2.43	4.31	7.25	12.74	24.74	159.84
		Classical	5.42	3.16	1.97	4.06	0.53	1.05	1.53	2.08	2.79	3.65	4.63	6.21	9.37	22.33
2006	1,428	Gross	45.70	4.85	5.58	27.15	-60.11	-1.35	0.76	1.92	3.66	6.18	10.14	16.94	30.66	450.33
		Net of Mkt	31.55	3.04	5.55	29.90	-104.94	-4.65	-0.50	0.87	2.15	4.08	7.14	13.08	23.35	375.72
		Classical	6.74	3.24	2.00	38.53	0.54	1.07	1.49	2.07	2.80	3.64	4.73	6.44	9.54	35.15

Note: The heading *Gross* denotes Total Yearly Compensation.
Net of Mkt denotes Total Yearly Compensation, net of the return on the market portfolio.
MAD stands for Median Absolute Deviation.
Skewness is the ratio of third moment about to the mean to the standard deviation.

Table 9: Distribution of Yearly Compensation – Millions of 2005 dollars – All CEOs

Year	Obs.		Mean	Median	MAD	Skewness	Means by Decile of Total Compensation									
							1	2	3	4	5	6	7	8	9	10
1993	715	Total	21.57	3.09	2.95	11.50	-59.15	-0.20	0.82	1.50	2.42	3.98	5.96	10.12	21.05	230.30
		Current	4.50	1.33	0.70	17.81	12.42	1.54	1.10	1.51	1.63	2.44	2.47	4.49	6.06	5.70
		Deferred	15.62	0.92	2.75	11.52	-71.57	-1.74	-0.28	-0.02	0.79	1.55	3.48	5.63	15.00	204.30
1994	1,334	Total	5.46	1.01	2.34	17.45	-46.18	-4.25	-0.75	0.31	0.74	1.37	2.28	4.00	8.04	89.28
		Current	6.43	1.40	0.78	31.19	30.97	4.52	1.77	1.04	1.43	1.56	2.07	3.84	3.78	10.67
		Deferred	-1.31	-0.14	2.26	-1.67	-77.15	-8.77	-2.52	-0.74	-0.69	-0.19	0.21	0.16	4.26	72.40
1995	1,401	Total	30.70	3.81	3.71	20.95	-13.62	-0.18	0.85	1.69	2.92	4.83	7.67	13.24	24.85	265.00
		Current	5.41	1.46	0.81	19.81	3.25	1.50	0.83	1.22	1.79	2.11	2.48	4.87	9.57	19.85
		Deferred	25.09	1.88	3.30	21.22	-16.87	-1.68	0.02	0.48	1.13	2.72	5.19	8.38	15.28	236.49
1996	1,439	Total	24.15	3.56	3.91	19.69	-24.86	-0.64	0.72	1.51	2.76	4.51	7.54	12.14	23.54	215.43
		Current	5.22	1.51	0.86	8.85	6.02	1.52	1.11	1.41	1.78	2.38	3.74	6.39	7.45	15.74
		Deferred	18.74	1.44	3.56	20.34	-30.88	-2.17	-0.39	0.10	0.98	2.13	3.80	5.75	16.09	192.96
1997	1,432	Total	53.70	6.67	6.41	29.18	-41.76	0.15	1.45	3.02	5.23	8.35	13.28	22.08	41.05	484.88
		Current	11.68	1.88	1.16	19.17	21.96	1.01	1.24	2.00	3.09	3.70	4.66	6.49	8.59	44.34
		Deferred	41.39	3.43	5.31	28.81	-63.71	-0.85	0.21	1.02	2.14	4.65	8.62	15.59	32.46	414.39
1998	1,438	Total	70.15	1.68	6.42	23.40	-65.21	-7.54	-2.26	-0.03	1.06	2.56	5.76	12.94	34.93	723.01
		Current	14.51	1.76	1.10	20.65	6.81	3.20	2.33	1.37	1.39	3.83	3.06	5.41	10.14	67.46
		Deferred	54.64	-0.01	5.92	22.86	-72.02	-10.74	-4.59	-1.40	-0.33	-1.28	2.70	7.53	24.79	604.78
1999	1,485	Total	98.45	1.74	6.64	24.95	-177.03	-8.35	-2.18	0.14	1.11	2.67	6.57	14.45	37.96	1,112.32
		Current	28.05	1.76	1.12	38.83	33.35	3.22	2.61	1.73	1.94	2.31	5.04	7.51	11.83	133.83
		Deferred	68.47	0.02	6.65	29.00	-210.38	-11.57	-4.78	-1.59	-0.83	0.37	1.53	6.94	26.13	881.22
2000	1,430	Total	-12.38	4.12	8.39	-29.32	-525.47	-8.15	-0.65	1.05	2.89	5.87	10.85	20.81	46.95	322.08
		Current	11.74	1.92	1.28	21.45	25.01	4.38	1.76	2.10	1.97	3.30	5.22	7.21	13.13	33.44
		Deferred	-24.96	1.36	8.02	-29.84	-550.48	-12.54	-2.41	-1.05	0.92	2.57	5.63	13.61	33.82	260.29
2001	1,396	Total	-2.00	2.08	6.26	14.37	-339.37	-12.21	-2.17	0.47	1.52	3.02	5.82	10.69	20.87	291.31
		Current	10.07	1.97	1.29	15.85	26.56	6.56	4.48	1.76	2.10	2.64	4.62	5.49	7.92	25.45
		Deferred	-12.81	0.23	5.94	14.03	-365.94	-18.77	-6.65	-1.29	-0.58	0.38	1.21	5.20	12.95	245.10
2002	1,448	Total	-20.90	0.43	4.81	-24.79	-336.86	-15.63	-5.42	-1.55	0.02	0.91	2.32	4.71	9.92	131.62
		Current	7.16	1.93	1.27	11.51	22.78	5.77	4.00	2.99	1.89	1.62	2.74	4.67	7.41	13.06
		Deferred	-28.51	-1.58	4.60	-24.43	-359.64	-21.40	-9.42	-4.54	-1.87	-0.71	-0.42	0.04	2.51	109.19
2003	1,522	Total	35.02	8.56	7.14	13.17	-28.12	1.37	2.94	4.82	7.18	10.66	15.53	24.53	44.57	267.06
		Current	12.10	2.08	1.34	16.97	21.62	1.14	1.61	2.42	2.75	3.82	4.95	7.29	11.64	47.85
		Deferred	22.46	5.19	5.22	6.98	-49.74	0.23	1.33	2.40	4.43	6.83	10.57	17.24	32.93	198.63
2004	1,517	Total	28.85	6.54	6.51	13.48	-36.84	-0.70	1.39	2.90	5.10	8.01	12.03	18.55	32.99	246.01
		Current	12.94	2.49	1.65	14.06	8.69	2.44	2.34	2.42	3.21	3.79	6.63	9.32	14.02	54.88
		Deferred	15.35	2.35	5.49	13.82	-45.53	-3.14	-0.95	0.48	1.89	4.23	5.40	9.23	18.97	163.51
2005	1,529	Total	18.47	3.91	5.07	11.67	-45.81	-2.91	0.28	1.40	2.95	4.98	8.05	14.15	27.00	175.34
		Current	23.01	2.49	1.70	37.77	28.25	4.64	1.54	3.49	3.07	4.88	5.15	6.84	11.51	120.63
		Deferred	-5.40	0.48	4.92	-32.40	-74.05	-7.55	-1.27	-2.08	-0.12	0.10	2.90	7.31	15.49	4.99
2006	1,428	Total	45.70	4.85	5.58	27.15	-60.11	-1.35	0.76	1.92	3.66	6.18	10.14	16.94	30.66	450.33
		Current	22.09	2.08	1.51	36.05	16.46	2.79	3.32	2.09	3.27	4.08	6.29	12.50	17.50	89.92
		Deferred	21.65	0.85	5.13	30.51	-76.57	-4.14	-2.56	-0.16	0.39	2.10	3.85	4.44	13.15	277.16

Note: *MAD* stands for Median Absolute Deviation.
Skewness is the ratio of third moment about to the mean to the standard deviation.

Table 10: Distribution of Yearly Compensation – Millions of 2005 dollars – Professional CEOs

Year	Obs.		Mean	Median	MAD	Skewness	Means by Decile of Total Compensation									
							1	2	3	4	5	6	7	8	9	10
1993	472	Total	4.64	2.36	1.82	2.19	-5.25	0.46	1.00	1.48	2.03	2.90	4.06	5.45	8.94	25.50
		Current	2.49	1.33	0.65	7.16	2.80	1.19	1.01	1.44	1.73	1.73	2.78	2.71	4.86	2.86
		Deferred	1.66	0.63	1.21	0.87	-8.05	-0.73	-0.01	0.04	0.31	1.16	1.28	2.74	4.08	15.83
1994	832	Total	2.17	1.12	1.12	-0.09	-7.24	-0.42	0.31	0.62	0.93	1.41	2.02	3.09	5.19	15.80
		Current	2.34	1.29	0.64	7.04	3.25	1.35	0.89	0.95	1.15	1.52	1.90	2.65	3.76	4.64
		Deferred	-0.23	-0.01	0.97	-1.76	-10.49	-1.77	-0.58	-0.33	-0.21	-0.11	0.12	0.43	1.43	9.22
1995	889	Total	8.21	2.99	2.47	9.62	-2.25	0.53	1.01	1.64	2.45	3.75	5.63	9.30	16.42	43.97
		Current	2.64	1.34	0.68	11.08	1.77	0.71	0.92	1.21	1.53	1.78	2.07	3.33	4.76	6.37
		Deferred	5.50	1.36	1.91	10.39	-4.02	-0.17	0.08	0.43	0.93	1.97	3.56	5.97	11.66	34.90
1996	920	Total	7.24	3.04	2.61	6.62	-6.16	0.41	0.90	1.55	2.38	3.76	5.68	8.86	13.57	41.48
		Current	2.80	1.39	0.71	7.23	1.82	0.79	1.03	1.29	1.66	2.01	2.44	3.16	5.65	6.20
		Deferred	4.36	1.20	1.95	6.52	-7.98	-0.38	-0.13	0.26	0.72	1.75	3.24	5.70	7.92	32.53
1997	928	Total	12.86	5.17	4.42	5.96	-6.15	0.72	1.54	2.63	4.25	6.37	9.46	14.70	25.64	69.89
		Current	4.47	1.73	0.97	13.39	2.68	0.88	1.24	1.76	2.37	3.51	4.09	4.94	7.51	11.21
		Deferred	8.19	2.51	3.15	6.32	-8.83	-0.16	0.30	0.87	1.88	2.86	5.37	9.76	18.13	52.01
1998	927	Total	11.78	1.60	3.56	6.95	-22.80	-3.41	-0.61	0.41	1.12	2.15	4.17	8.60	19.93	108.93
		Current	5.43	1.71	0.98	19.17	4.28	3.19	1.61	1.03	1.50	2.08	4.96	3.85	6.44	16.33
		Deferred	6.02	0.02	3.30	4.05	-27.08	-6.61	-2.23	-0.62	-0.38	0.07	-0.80	4.75	13.48	80.10
1999	941	Total	17.87	1.53	3.84	14.08	-25.05	-3.62	-0.49	0.47	1.11	2.20	4.32	8.84	22.66	168.48
		Current	5.64	1.68	0.99	7.72	4.93	2.97	1.90	0.99	1.46	2.04	2.59	4.37	7.95	17.47
		Deferred	11.94	0.04	3.78	15.35	-29.98	-6.59	-2.39	-0.52	-0.35	0.16	1.73	4.47	14.70	138.51
2000	911	Total	11.71	3.26	5.18	3.79	-76.31	-3.25	0.21	1.18	2.60	4.58	7.91	13.97	27.72	138.71
		Current	10.03	1.86	1.13	24.70	13.50	3.37	1.09	1.28	1.69	2.83	4.29	5.44	10.05	34.68
		Deferred	1.04	0.97	4.93	-4.34	-89.81	-6.62	-0.88	-0.10	0.91	1.75	3.62	8.53	17.66	75.44
2001	922	Total	19.10	1.79	3.91	29.93	-76.49	-5.99	-0.83	0.70	1.46	2.48	4.29	7.25	12.87	245.85
		Current	6.37	1.85	1.11	18.98	14.64	5.39	2.12	1.17	2.32	2.57	2.93	4.97	6.81	13.32
		Deferred	12.24	0.16	3.76	29.83	-91.14	-11.39	-2.96	-0.46	-0.86	-0.10	1.35	2.27	6.06	220.23
2002	997	Total	-21.27	0.54	3.16	-31.41	-237.55	-8.43	-2.75	-0.69	0.25	0.92	2.05	3.71	7.04	21.39
		Current	4.41	1.88	1.17	17.52	8.35	4.58	2.89	2.20	1.69	1.50	2.31	3.36	4.97	8.38
		Deferred	-25.95	-1.15	2.87	-31.41	-245.90	-13.01	-5.64	-2.88	-1.44	-0.57	-0.26	0.36	2.07	6.36
2003	1,075	Total	16.56	6.93	5.35	9.54	-1.72	1.35	2.62	4.04	5.88	8.26	11.60	17.04	27.15	89.72
		Current	6.55	2.06	1.27	19.72	2.16	1.04	1.48	1.93	2.89	3.40	4.19	5.80	8.09	25.21
		Deferred	9.78	3.94	3.80	-5.11	-3.88	0.31	1.15	2.12	2.99	4.86	7.41	11.24	19.07	52.71
2004	1,069	Total	12.60	5.05	4.81	14.57	-9.76	-0.11	1.35	2.52	4.05	6.56	9.59	14.47	22.36	75.46
		Current	7.79	2.46	1.54	27.98	5.84	2.03	1.83	2.18	2.92	3.40	4.93	8.12	9.79	25.91
		Deferred	4.47	1.94	4.09	-1.56	-15.60	-2.14	-0.47	0.34	1.13	3.16	4.66	6.35	12.58	34.95
2005	1,103	Total	9.16	3.64	3.83	8.72	-18.72	-0.95	0.62	1.54	2.83	4.45	6.68	10.74	18.95	65.61
		Current	8.79	2.41	1.57	31.85	11.18	2.73	1.77	4.09	2.87	5.50	4.85	5.87	9.84	28.91
		Deferred	0.04	0.44	3.56	-24.36	-29.90	-3.67	-1.15	-2.55	-0.03	-1.05	1.83	4.87	9.11	22.99
2006	1,045	Total	13.04	4.37	4.53	21.75	-20.38	-0.37	0.89	1.91	3.27	5.45	8.78	14.30	23.93	92.95
		Current	11.64	2.04	1.44	22.91	8.31	2.58	1.60	2.12	3.13	4.05	6.44	9.12	23.76	34.36
		Deferred	0.42	0.69	3.80	-6.65	-28.69	-2.95	-0.71	-0.22	0.13	1.40	2.34	5.18	0.17	27.56

Note: *Professional CEOs* are those whose equity stake is less than 1%
MAD stands for Median Absolute Deviation.
Skewness is the ratio of third moment about to the mean to the standard deviation.

Table 11: Distribution of Yearly Compensation – Millions of 2005 dollars – Non–CEOs

Year	Obs.		Mean	Median	MAD	Skewness	Means by Decile of Total Compensation									
							1	2	3	4	5	6	7	8	9	10
1993	4,601	Total	3.98	0.90	0.64	36.13	-3.20	0.25	0.39	0.56	0.77	1.07	1.53	2.36	4.31	31.74
		Current	1.07	0.45	0.21	27.44	1.91	0.29	0.44	0.51	0.61	0.75	0.96	1.23	1.73	1.20
		Deferred	2.48	0.20	0.42	35.21	-5.11	-0.04	-0.05	0.05	0.16	0.32	0.57	1.13	2.58	25.18
1994	6,993	Total	1.14	0.52	0.41	12.32	-6.12	-0.02	0.21	0.32	0.45	0.61	0.85	1.29	2.22	11.60
		Current	0.97	0.45	0.22	15.71	2.26	0.54	0.34	0.39	0.47	0.68	0.78	0.99	1.40	1.21
		Deferred	0.02	0.01	0.32	8.79	-8.39	-0.56	-0.13	-0.07	-0.03	-0.08	0.07	0.29	0.82	8.30
1995	7,243	Total	3.98	0.97	0.73	30.71	-1.86	0.24	0.37	0.55	0.81	1.17	1.71	2.65	4.76	29.41
		Current	1.27	0.48	0.23	32.89	0.84	0.28	0.40	0.48	0.58	0.77	0.93	1.23	1.85	2.40
		Deferred	2.51	0.28	0.45	29.64	-2.70	-0.04	-0.04	0.07	0.22	0.40	0.78	1.42	2.90	22.06
1996	7,369	Total	3.85	0.91	0.71	37.91	-5.08	0.21	0.35	0.52	0.76	1.12	1.74	2.79	5.10	30.99
		Current	1.27	0.49	0.24	70.54	1.31	0.32	0.41	0.50	0.66	0.78	1.01	1.22	1.83	2.19
		Deferred	2.39	0.23	0.52	35.18	-6.39	-0.11	-0.05	0.02	0.10	0.35	0.72	1.57	3.27	24.43
1997	7,419	Total	7.03	1.32	1.07	43.37	-5.15	0.27	0.46	0.71	1.08	1.66	2.52	4.13	7.53	57.21
		Current	1.66	0.52	0.26	63.44	1.25	0.30	0.45	0.59	0.75	0.93	1.12	1.73	2.47	2.96
		Deferred	5.01	0.48	0.73	43.89	-6.39	-0.04	0.01	0.13	0.33	0.73	1.41	2.40	5.06	46.49
1998	7,668	Total	7.17	0.70	0.89	44.97	-8.48	-0.35	0.20	0.36	0.57	0.90	1.53	2.76	6.01	68.22
		Current	2.50	0.52	0.26	49.81	2.40	0.87	0.37	0.44	0.63	0.80	1.08	1.52	2.69	5.31
		Deferred	4.06	0.04	0.82	39.00	-10.88	-1.21	-0.17	-0.07	-0.06	0.10	0.45	1.24	3.32	47.94
1999	7,854	Total	8.10	0.72	0.84	59.90	-14.02	-0.28	0.23	0.39	0.59	0.92	1.53	2.87	6.79	82.00
		Current	2.49	0.56	0.29	69.50	4.26	0.90	0.36	0.49	0.67	0.95	1.12	1.76	2.68	5.24
		Deferred	5.18	0.04	0.78	57.14	-18.28	-1.18	-0.13	-0.10	-0.08	-0.03	0.41	1.12	4.11	65.96
2000	7,295	Total	3.45	1.03	1.07	0.94	-45.49	-0.10	0.30	0.51	0.83	1.32	2.22	4.02	8.27	62.61
		Current	4.76	0.60	0.33	65.99	27.54	0.75	0.36	0.66	0.77	1.02	2.42	2.08	3.69	5.74
		Deferred	-2.38	0.15	1.02	-37.42	-73.03	-0.85	-0.06	-0.15	0.06	0.30	-0.19	1.94	4.58	43.55
2001	7,160	Total	-0.71	0.80	0.91	-56.70	-43.23	-0.58	0.24	0.43	0.66	1.01	1.55	2.52	4.50	25.76
		Current	2.92	0.58	0.31	87.66	14.38	1.35	0.45	0.51	0.64	0.97	1.16	1.64	2.59	3.59
		Deferred	-4.25	0.06	0.88	-70.62	-57.61	-1.92	-0.21	-0.08	0.02	0.04	0.39	0.88	1.91	14.13
2002	7,557	Total	-2.01	0.54	0.72	-79.08	-41.77	-0.98	0.06	0.28	0.44	0.66	1.00	1.56	2.71	15.93
		Current	2.44	0.60	0.31	65.07	11.17	1.37	0.59	0.42	0.55	0.70	1.13	1.61	2.31	3.05
		Deferred	-4.92	0.00	0.59	-79.03	-52.94	-2.35	-0.53	-0.14	-0.11	-0.03	-0.12	-0.05	0.40	6.66
2003	7,913	Total	5.92	1.70	1.27	-15.68	-4.75	0.40	0.66	0.99	1.43	2.01	2.88	4.30	7.53	43.82
		Current	2.38	0.63	0.34	65.53	4.14	0.41	0.57	0.70	0.97	1.13	1.36	1.84	2.80	4.68
		Deferred	3.15	0.66	0.71	-55.32	-8.89	-0.01	0.09	0.29	0.46	0.88	1.52	2.46	4.73	30.03
2004	7,902	Total	6.19	1.43	1.17	57.85	-5.46	0.23	0.49	0.80	1.19	1.74	2.55	3.88	6.67	49.77
		Current	3.81	0.75	0.42	77.43	11.12	0.54	0.56	0.76	1.00	1.21	1.50	2.13	3.63	9.30
		Deferred	2.04	0.34	0.87	-13.08	-16.58	-0.31	-0.07	0.04	0.20	0.53	1.05	1.75	3.04	30.71
2005	6,816	Total	3.34	1.28	1.12	-43.77	-19.31	0.09	0.41	0.70	1.05	1.56	2.35	3.68	6.18	36.70
		Current	4.14	0.83	0.47	65.00	13.46	0.68	0.66	0.90	1.24	1.28	6.08	2.39	4.18	7.69
		Deferred	-1.07	0.17	0.91	-41.97	-32.78	-0.59	-0.25	-0.20	-0.19	0.28	-3.72	1.29	2.00	23.43
2006	5,414	Total	4.95	1.30	1.14	4.79	-14.79	0.09	0.41	0.68	1.05	1.59	2.39	3.82	6.75	47.56
		Current	3.72	0.62	0.34	42.22	8.66	0.71	0.61	0.97	1.35	1.41	2.14	2.69	4.56	5.83
		Deferred	0.02	0.13	1.01	-26.60	-23.46	-0.63	-0.20	-0.29	-0.30	0.18	0.26	1.13	2.18	21.36

Note: *MAD* stands for Median Absolute Deviation.
Skewness is the ratio of third moment about to the mean to the standard deviation.

Table 12: Compensation Across Sectors – Millions of 2005 dollars – All CEOs

Year		All	Mining	Manuf.	Transp.	Whole	Retail	FIRE	Services
1993	Mean	21.99	5.87	8.41	34.26	11.72	-3.05	22.88	64.81
	Median	3.17	3.01	3.19	1.95	4.95	4.85	3.26	5.87
	Obs.	715	30	342	112	17	51	92	60
1994	Mean	5.46	-0.00	4.97	-5.27	-2.77	-5.49	1.70	28.25
	Median	1.01	0.34	1.58	0.59	0.65	0.12	1.36	2.57
	Obs.	1,334	58	592	202	41	107	185	125
1995	Mean	30.77	4.67	20.72	8.52	6.24	13.26	39.04	86.84
	Median	3.81	2.47	4.29	1.75	2.25	1.22	9.58	5.16
	Obs.	1,401	62	627	208	44	118	183	135
1996	Mean	24.04	9.04	15.98	9.12	6.13	21.40	31.49	82.74
	Median	3.56	5.98	3.36	1.34	1.65	4.10	9.72	3.40
	Obs.	1,439	65	639	204	43	127	190	146
1997	Mean	53.74	12.12	25.73	43.46	8.68	38.85	63.75	173.07
	Median	6.67	1.68	5.79	3.06	3.57	9.12	20.68	6.97
	Obs.	1,432	63	655	184	45	129	177	156
1998	Mean	69.78	-9.65	42.37	43.97	7.57	59.51	38.55	199.99
	Median	1.68	-2.04	0.97	1.95	1.51	5.34	3.64	5.80
	Obs.	1,438	59	652	162	46	128	178	190
1999	Mean	97.87	10.61	35.33	68.21	7.00	26.52	24.01	520.16
	Median	1.71	3.11	2.61	1.01	1.32	0.34	-0.97	4.41
	Obs.	1,485	62	661	161	51	133	181	210
2000	Mean	-12.12	26.94	11.51	-16.55	13.72	-51.30	67.28	-190.04
	Median	4.05	7.72	2.47	3.35	2.72	3.44	17.49	2.00
	Obs.	1,430	62	629	155	49	130	181	197
2001	Mean	-1.67	-14.74	-6.53	1.57	16.72	6.59	76.01	-76.73
	Median	2.09	0.15	1.87	1.44	3.94	6.20	2.81	2.53
	Obs.	1,396	56	614	145	49	125	180	203
2002	Mean	-20.98	5.27	-8.72	-11.22	-4.65	-1.00	-110.76	3.69
	Median	0.42	2.47	0.31	0.83	0.19	0.23	1.67	-0.69
	Obs.	1,448	57	638	145	48	117	203	214
2003	Mean	35.12	13.37	27.50	33.55	9.68	61.72	42.44	23.58
	Median	8.56	5.41	7.71	6.60	3.80	12.03	16.45	9.26
	Obs.	1,522	65	654	152	47	125	222	230
2004	Mean	28.56	21.06	24.18	36.27	14.38	6.10	34.47	32.18
	Median	6.55	8.06	5.39	5.27	8.10	6.58	10.79	6.08
	Obs.	1,517	61	650	155	49	130	217	225
2005	Mean	18.27	42.95	10.88	15.53	12.13	11.38	33.16	24.84
	Median	3.90	16.11	2.51	4.01	5.26	6.02	4.82	4.43
	Obs.	1,529	58	649	156	50	121	238	224
2006	Mean	46.32	34.70	19.98	63.31	10.32	9.80	35.75	120.15
	Median	4.89	3.22	4.16	5.82	4.81	4.65	7.59	4.43
	Obs.	1,428	54	617	152	46	118	213	196

Note: *Whole* stands for Wholesale Trade.
FIRE stands for Finance, Insurance, and Real Estate.

Table 13: Median Wealth Across Sectors – Millions of 2005 dollars – All CEOs

Year		All	Mining	Manuf.	Transp.	Whole	Retail	FIRE	Services
1993	Wealth	16.13	9.20	16.69	8.78	9.62	27.80	23.30	22.25
	Stock	4.99	2.39	5.36	1.68	4.79	12.47	6.60	9.43
	Options	1.38	0.73	1.42	0.40	0.67	1.81	3.32	1.18
1994	Wealth	17.16	8.39	19.25	8.97	14.81	24.00	19.08	23.49
	Stock	5.67	2.14	6.58	1.50	3.67	13.17	6.21	7.63
	Options	1.75	0.98	1.82	0.41	1.43	1.34	2.84	3.04
1995	Wealth	16.21	9.32	17.91	8.33	12.26	22.12	20.01	23.63
	Stock	4.82	2.70	5.06	1.34	3.09	12.19	6.51	6.99
	Options	1.53	0.96	1.83	0.21	1.01	1.04	2.26	3.10
1996	Wealth	19.29	12.85	20.38	9.63	14.08	23.32	26.82	26.19
	Stock	5.55	2.40	5.91	1.93	4.52	9.71	9.35	6.81
	Options	2.57	1.74	2.83	0.58	1.63	0.86	5.04	4.57
1997	Wealth	23.40	16.36	23.39	10.76	14.63	29.56	36.86	28.04
	Stock	6.93	3.03	6.61	2.25	5.06	10.06	11.21	11.78
	Options	3.72	3.84	3.65	0.84	3.23	2.36	8.09	4.53
1998	Wealth	27.16	18.29	25.16	14.27	20.40	36.59	46.95	35.35
	Stock	8.26	4.98	7.22	3.16	6.40	13.61	15.18	11.51
	Options	4.99	3.85	4.68	1.70	3.32	4.29	12.09	7.04
1999	Wealth	25.89	11.51	22.79	17.35	18.51	32.37	48.85	33.79
	Stock	7.84	2.13	6.39	3.29	7.15	12.54	18.18	12.25
	Options	4.21	0.86	3.49	2.39	3.02	3.78	10.97	7.39
2000	Wealth	25.87	12.14	24.83	19.18	20.11	25.54	41.97	42.51
	Stock	7.60	1.83	6.55	3.13	6.15	9.27	16.94	11.45
	Options	3.70	1.81	3.75	1.69	2.17	2.04	6.50	6.98
2001	Wealth	27.49	20.46	23.54	20.13	20.09	27.53	54.99	34.64
	Stock	6.79	5.58	5.68	4.54	5.38	8.03	21.32	7.90
	Options	5.05	5.19	4.42	3.39	2.04	4.48	12.17	7.20
2002	Wealth	26.70	17.76	23.06	19.61	20.35	34.03	43.26	31.83
	Stock	6.58	3.88	5.38	3.53	4.41	10.10	18.16	6.18
	Options	5.25	3.17	4.75	3.38	2.95	7.71	7.83	7.10
2003	Wealth	21.40	18.21	19.19	17.16	15.43	25.69	38.49	20.10
	Stock	5.27	4.13	4.51	3.21	4.83	5.00	13.72	4.34
	Options	2.89	3.07	2.62	2.10	2.08	3.82	5.16	2.45
2004	Wealth	28.47	23.60	26.89	21.39	22.48	32.28	44.77	27.42
	Stock	7.19	6.93	6.32	5.02	7.28	6.10	16.80	6.43
	Options	5.62	4.55	5.41	3.15	3.40	7.91	9.22	6.52
2005	Wealth	30.83	28.79	25.94	22.06	26.92	37.83	49.80	28.00
	Stock	7.43	7.39	5.71	4.36	7.41	7.39	19.68	6.43
	Options	6.38	7.81	5.37	3.31	7.87	8.71	9.20	6.92
2006	Wealth	26.75	40.56	21.82	20.72	23.30	29.02	46.46	25.63
	Stock	8.50	12.67	6.60	8.00	5.90	6.86	23.14	7.31
	Options	5.93	12.08	4.56	3.01	6.22	7.58	8.06	6.15

Note: *Whole* stands for Wholesale Trade.
FIRE stands for Finance, Insurance, and Real Estate.

Table 14: Median Regression Estimates of Pay–Performance Sensitivities

	All Executives			All CEOs			Professional CEOs		
Dependent Variables:	Total	Current	Deferred	Total	Current	Deferred	Total	Current	Deferred
Shareholder_Gain	6.724	0.859	4.817	34.370	2.573	27.925	21.861	2.000	17.580
	(0.026)	(0.013)	(0.014)	(0.205)	(0.093)	(0.149)	(0.149)	(0.084)	(0.101)
Sh_Gain × Variance_idio	-6.662	-0.945	-4.706	-33.211	-2.795	-27.135	-20.547	-2.172	-16.056
	(0.029)	(0.014)	(0.016)	(0.209)	(0.102)	(0.163)	(0.151)	(0.085)	(0.102)
Sh_Gain × Variance_sys	0.390	0.095	0.282	1.025	0.299	1.120	0.311	0.260	-0.172
	(0.011)	(0.006)	(0.006)	(0.036)	(0.040)	(0.065)	(0.022)	(0.012)	(0.015)
Number of observations	87,589	88,320	87,589	14,253	14,339	14,253	9,529	9,591	9,529
Pseudo R^2	0.045	0.007	0.033	0.076	0.009	0.063	0.212	0.023	0.176

Note: Standard errors in parenthesis.

Table 15: Median Regression Estimates of Pay–Performance Sensitivities

	All Executives			All CEOs			Professional CEOs		
Dependent Variables:	Total	Current	Deferred	Total	Current	Deferred	Total	Current	Deferred
Shareholder_Gain	6.897	0.659	5.374	36.866	2.209	31.609	23.550	1.597	19.466
	(0.017)	(0.009)	(0.012)	(0.145)	(0.056)	(0.132)	(0.122)	(0.052)	(0.080)
Sh_Gain × Variance_distrib	-2.955	-0.507	-1.996	-11.427	-1.427	-7.457	-8.993	-1.021	-7.271
	(0.018)	(0.009)	(0.013)	(0.157)	(0.060)	(0.143)	(0.133)	(0.056)	(0.087)
Variance_distrib	1,562.742	1,080.894	171.277	3,917.409	3,598.408	-1,035.553	3,576.366	3,203.788	-258.470
	(23.421)	(11.244)	(16.096)	(197.215)	(74.491)	(179.887)	(177.601)	(73.906)	(115.977)
Sh_Gain × Sales_distrib	-4.802	-0.197	-4.085	-32.047	-1.015	-30.434	-17.789	-0.720	-14.738
	(0.007)	(0.004)	(0.005)	(0.067)	(0.026)	(0.061)	(0.058)	(0.024)	(0.037)
Sales_distrib	530.745	340.554	11.397	605.461	319.166	576.259	1,193.952	598.993	-17.240
	(30.006)	(13.899)	(20.622)	(250.497)	(91.950)	(228.469)	(228.758)	(93.277)	(149.336)
Number of observations	103,113	105,103	103,113	16,953	17,182	16,953	11,357	11,489	11,357
Pseudo R^2	0.056	0.021	0.038	0.094	0.023	0.079	0.251	0.063	0.204

Note: Standard errors in parenthesis.