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Elite CEOs: Impact on Compensation and Firm Performance Models

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To the Graduate Council:

I am submitting herewith a dissertation written by Mark J. Pate entitled "Elite CEOs: Impact on Compensation and Firm Performance Models." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

Michael C. Ehrhardt, Major Professor

We have read this dissertation and recommend its acceptance:

Phillip R. Daves, Tracie M. Woidtke, Donald J. Bruce

Accepted for the Council:

Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Elite CEOs: Impact on Compensation and Firm Performance Models

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Mark Jerome Pate
August 2008

Dedication

This dissertation is dedicated to my wife Beth, our sons Taylor and Austin, my father Charles and his wife Barbara, my brother Matthew, and my sister Jennifer, her husband Michael and their daughter Audrey. I truly appreciate their love, support and encouragement throughout the doctoral program.

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Abstract

A particular body of research examines the issue of linking executive pay to firm performance by focusing on the observation that CEO compensation varies widely across firms, even within the same industry. This research assumes that the same compensation model (i.e., structure of the model, explanatory variables, and coefficients on those variables) can be applied to all CEOs. If you will, extant research assumes a one-size-fits-all CEO compensation model approach to empirical analysis. Furthermore, much of this research also examines firm performance and similarly utilizes a one-size-fits-all firm performance model. I develop a proxy for CEO managerial power that I use to rank and classify CEOs into two groups: Elite CEOs (above a cut-off by the ranking) and Non-Elite CEOs (the remaining CEOs). As a note, I demonstrate that ranking the CEOs by my proxy for CEO managerial power is not the same as simply ranking the CEOs by their total direct compensation. My empirical results show that a one-size-fits-all model can be rejected. That is, the estimated coefficients in compensation models and firm performance models are different for Elite CEOs as compared to Non-Elite CEOs. Also, firms with Elite CEOs do not have higher performance. This suggests that Elite CEOs extract excessive compensation due to undue influence over their respective boards rather than to superior performance. These findings have both academic and corporate policy implications.

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1 Overview

The tremendous increase in CEO total compensation and the increased use of and payouts from stock options since the early 1990s has generated considerable debate and concern in boardrooms, in the financial press, and among academics. The following quote from the New York Times nicely portrays the prevailing sentiment regarding this issue. “Corporations have been wrestling for decades with ways to link pay to performance, with little success. In the 1980’s, they tried tying cash bonuses to rising sales or earnings, only to find that the payouts encouraged executives to make decisions that yielded short-term results—and often longer-term disasters. In the 1990’s, companies tried stock options, figuring that they would be the best way to tie the executives’ fortunes to those of shareholders. Instead, they prompted some managers to time decisions to pump up the stock price just when the options vested. Bonuses and options at Tyco and Enron, for example, did little to prevent widespread accounting frauds at either company. The secret to linking pay to performance remains elusive.” Deutsch (2005)

A particular body of research examines this issue of linking executive pay to firm performance by focusing on the observation that CEO compensation varies widely across firms, even within the same industry. This research uses CEO characteristics, (such as “superstar” or “celebrity” status, “reputation”, “skill”, “managerial power”, age, dual role as CEO and Chairman of the Board, and percent of firm ownership by the CEO) and firm characteristics (such as size, complexity, growth opportunities, and leverage) to explain ‘why’ CEO compensation varies widely in cross-section. However, this research assumes that the same compensation model (i.e., structure of the model, explanatory

variables, and coefficients on those variables) can be applied to all CEOs (this assumption is implicit in the use of all CEO's in the samples for which the models are tested). If you will, extant research assumes a one-size-fits-all CEO compensation model approach to empirical analysis. Furthermore, much of this research also examines firm performance and similarly utilizes a one-size-fits-all firm performance model.

Holmstrom and Kaplan (2003) shed a different light on this issue by suggesting that only a few CEOs have sufficient managerial power or influence to extract excessive compensation. These authors argue that "U.S. executive pay may not be quite the runaway train that has been portrayed in the press." However, I find no research that thoroughly investigates the impact and distortions that a class of 'only a few' powerful CEOs has on the one-size-fits-all CEO compensation and firm performance models. In other words, does this class of powerful CEOs affect only the residual term in the models, or does it also affect the estimated coefficients of the model? If so, including these CEOs in a sample without making any special adjustments might lead to a spurious interpretation of the resulting estimated model. In addition, the literature has not examined whether the firms that are managed by such CEOs experience superior performance. This void in the literature motivates my research.

To empirically test the Holmstrom and Kaplan hypothesis that only a few powerful CEOs can extract excessive compensation, a proxy for CEO managerial power is required. I develop two separate proxies for CEO managerial power that I use to rank and classify the CEOs.¹ First, I use the ratio of CEO total direct compensation to the

¹ I demonstrate that ranking the CEOs by my proxy for CEO managerial power is not the same as simply ranking the CEOs by their total direct compensation.

total direct compensation of the highest paid executive, other than the CEO, as a proxy for CEO managerial power. This ratio has been used in previous literature for a slightly different purpose, as I describe in Section 3. Second, for robustness and sensitivity tests I develop a concentration measure of CEOs compensation, based on the top five executive's compensation at each firm, which is analogous to the concentration ratio used to measure industry competitiveness (the Herfindahl Index).

I hypothesize that the most powerful (or "Elite") class of CEOs, as defined by my proxies, receives excessive compensation relative to the class of other (or "Non-Elite") CEOs. For this hypothesis my empirical test is whether Elite CEOs receive higher and different compensation, after controlling for other variables, than Non-Elite CEOs; and if so, how are Elite CEOs compensated differently? Furthermore, I hypothesize that Elite CEOs' firms do not experience superior performance compared to Non-Elite CEOs' firms. For this hypothesis my empirical test is whether Elite CEOs' firms perform differently, after controlling for other variables, than Non-Elite CEOs' firms; and if so, how do Elite CEOs' firms perform differently?

If Elite CEOs receive higher compensation but their firms do not provide superior performance, then this suggests that Elite CEOs' compensation is due to their influence over their board rather than to their ability. Also, if the firms of Elite CEOs do not have superior performance, then the inclusion of Elite CEOs in the samples of previous studies of the links between firm performance and CEO compensation might have biased the results. In other words, it is possible that the link between firm performance and CEO compensation is much stronger for most CEOs than previously thought.

My empirical results show that one-size-fits-all models can be rejected. The estimated coefficients in compensation models and firm performance models are different for Elite CEOs as compared to Non-Elite CEOs. Also, firms with Elite CEOs do not have higher performance. In fact, I find evidence suggesting that the presence of an Elite CEO hurts firm performance and value. This suggests that Elite CEOs extract excessive compensation due to influence over their respective boards rather than to superior performance. These findings have two important implications. First, it is possible that previous empirical research results and conclusions regarding the link between CEO compensation and firm performance might be distorted because previous studies have failed to explicitly address the impact caused by a small number of highly-paid influential CEOs. Second, it is important for shareholders, boards, and policy makers to understand the link (if one exists) between CEO managerial power and firm performance.

This dissertation has two distinct components. The first is a broad survey of the literature addressing the structure of CEO compensation, the relationships between CEO compensation and firm performance, and the relationship between corporate governance and CEO compensation. The second component is an empirical test of several very specific hypotheses related to CEO managerial power, compensation, and firm performance. Note that the survey is intentionally broad so that it could be used as a primer on CEO compensation and firm performance. As such, the survey does not specifically inform this research. Instead, the specific literature review that motivates the empirical research is provided in Section 3.

The remainder of this dissertation is organized as follows. Section 2 is the broad literature survey of previous research that investigates the structure of CEO

compensation, the relationship between CEO compensation and firm performance, and the relationship between corporate governance and CEO compensation. Section 3 reviews the specific literature that motivates this research. Section 4 describes the methodology for this research. Section 5 describes the data set used for this research. Section 6 presents and reviews the results. Section 7 offers closing comments.

2 Literature Survey

The focus of this literature survey is on the body of previous research that investigates the structure of CEO compensation, the relationship between CEO compensation and firm performance, or the relationship between corporate governance and CEO compensation. This survey is intentionally broad so that it could be used as a primer on CEO compensation. As such, the survey does not specifically inform this research. Instead, the specific literature review that motivates this research is provided in Section 3.

Sections 2.1 and 2.2 provide a brief description of agency theory and corporate governance, respectively, as a lead in to a more thorough discussion of internal governance and external governance in Sections 2.3 and 2.4, respectively. Sections 2.3 and 2.4 are laid out in a similar format as a review of corporate governance presented in Gillan (2006).

2.1 Agency Theory

The separation of ownership (stockholders) and control (management) of the modern corporation is the classic agency problem suggested by Berle and Means (1932) and formalized by Jensen and Meckling (1976) that gives rise to potential conflicts between stockholders and management. In a large corporation, the ownership may be so diffuse that the stockholders cannot even make known their objectives let alone control or influence management. This creates a situation where management may act in its own best interest rather than the interests of the stockholders. However, stockholders do delegate decision-making and operational authority to management expecting that

management will act in the best interest of the stockholders. Jensen and Meckling (1976) showed that stockholders could assure themselves that management will make optimal decisions (1) only if management is monitored and (2) only if appropriate incentives are given to management. This issue of potential conflict between stockholders and management gives rise to the topic and purpose of corporate governance.

2.2 Corporate Governance

Corporate governance is generally considered to be the set of complementary mechanisms intended to align the actions and choices of managers with the interests of stockholders. Corporate governance entails the relationships among a firm's stockholders, board of directors, and executive management. These relationships provide the framework within which objectives are set and performance is monitored. Corporate governance is also the framework by which management is monitored by the board of directors and incentives are set by the board of directors in an attempt to align management with the objectives of the stockholders. These last two functions of corporate governance relate directly to the two points made by Jensen and Meckling (1976) noted previously. Within the corporate governance literature there is research related to both monitoring and incentives (executive compensation). The focus of this paper is to extend the literature related to executive compensation, particularly the relationship between firm performance and CEO compensation.

There are several definitions of corporate governance found in the literature. Zingales (1998a) views corporate governance systems as the complex set of constraints that shape the ex post bargaining over the quasi-rents generated by the firm. Shleifer and

Vishny (1997) define corporate governance as the ways in which suppliers of financing to corporations assure themselves of getting an acceptable return on their investment. Gillan and Starks (1998) define corporate governance as the system of laws, rules, and factors that control operations at a company. Regardless of the particular definition used, researchers often view corporate governance mechanisms as falling into one of two categories: those *internal* to the firm and those *external* to the firm. I review the literature on these two categories in turn. While there is a tremendous volume of literature available on corporate governance my focus is on the research that relates to CEO compensation, executive compensation, or firm performance.

2.3 Internal Governance

This sub-section reviews the following elements of the corporate governance system that are *internal* to the firm: board of directors, managerial incentives, capital structure, bylaw and charter provisions, and managerial power.

2.3.1 Board of Directors

The board of directors ('board') has a fiduciary obligation to stockholders and the responsibility to monitor the executives' and firm's performance, hire and fire the CEO, set executive compensation, and provide strategic direction; obviously the board's role in corporate governance is important. Traditionally, research on corporate boards has focused on links between board characteristics and CEO compensation, firm value and performance, governance choices, and investment and financing decisions (including the sale of the firm). Unfortunately, the impact of board structure on executive compensation

and firm performance is unclear given the mixed results of empirical research. Furthermore, there is no clear evidence in the literature for the optimal board structure (number of directors, number of outside versus inside directors, ownership, etc.) as it relates to firm performance or executive compensation.

The literature examines corporate governance issues that limit the effectiveness of the board of directors. Jensen (1993) argues that typical boards of directors often fail to effectively monitor the firm's management for several reasons: boards have a collegial culture that does not encourage constructive criticism, boards are too large and cumbersome, there is insufficient equity ownership represented on the board, and because of the informational asymmetry that exists between management and the board. Crystal (1991) argues that directors are ineffective at setting CEO compensation because outside directors are hired and can be fired by the CEO (some describe this as managerial power or cronyism). Goyal and Park (2002) find that CEO turnover is less sensitive to firm performance when the CEO is also the chairman of the board suggesting that this duality limits the board's effectiveness.

Some argue that the board composition of outside directors (directors that are not employees of the firm) and inside directors (employees of the firm) is an indication of the board's ability to act independently of the CEO. The relationship between board composition and executive compensation has been examined in many empirical papers. Hallock (1997) finds CEO compensation is higher at firms with interlocked directors (interlocked is defined as firm A's chairman or CEO sits on the board of another firm whose chairman or CEO sits on the board of firm A) which suggests mutual back scratching or cronyism. Lambert, Larcker and Weigelt (1993) find CEOs receive higher

pay with a higher percent of board members appointed by CEO (mutual back scratching or cronyism) and find a positive relation between CEO compensation and the percent of outside directors.

However, Finkelstein and Hambrick (1989) do not find that CEO compensation is related to the percent of outside directors. Core, Holthausen and Larcker (1999) find that a weak board composition, including interlocked, gray, and busy directors, is associated with higher CEO compensation and lower firm performance. This research does not explicitly identify the optimal board composition but it implies that board composition does matter. The research implies, at least to me, that a higher percent of outside directors is better provided that the outside directors are not hired by the CEO, interlocked, gray, and too busy – which in practice is probably a pretty tall order.

The relationship between board composition and firm value and performance has also been investigated and again the results are mixed. Rosenstein and Wyatt (1990) find a positive stock price reaction at the announcement of an additional outside director suggesting the market perceives this action as an improvement to the firm's governance. However to the contrary, Yermack (1996) finds no association between percent of outside directors and firm performance. Yermack (1996) finds that firm value and performance is decreasing function of board size which implies having too many directors can make the board ineffective but it does not speak to the optimal composition of outside versus inside directors. Hermalin and Weisbach (1991) find no meaningful relation between various characteristics of board composition and firm performance.

Recent empirical work by Brick, Palmon and Wald (2006) examines the relationship between board characteristics (particularly director compensation) and CEO

compensation. The authors suggest that CEO and director compensation levels may be related for one of several possible reasons. For instance, a negative relation between CEO compensation and directors' compensation could exist if directors' increased effort substitutes for a lack of CEO effort. Alternatively, a positive relationship between CEO compensation and directors' compensation could exist for two reasons: (1) if the firm is large and complex, this affects the skill and effort required of both the CEO and the directors or (2) a positive relation could reflect cronyism, where the CEO and the directors put their joint interests ahead of the interests of the stockholders.

In order to distinguish between these alternative explanations, Brick, Palmon and Wald (2006) model CEO and director compensation and find a significant positive relation between excess CEO compensation and excess director compensation. The authors regress the future firm performance on excess CEO compensation and excess director compensation. If cronyism were the primary reason for the positive relationship between excess CEO compensation and excess director compensation, they would expect a negative relationship between future firm performance and excess CEO and director compensations. This negative association between excess compensation and future firm performance would reflect the suboptimal performance of a CEO and directors that put self-interest ahead of stockholder interests.

In contrast, if firm risk and complexity were the primary reasons for a positive relationship between excess CEO compensation and excess director compensation, they would expect a weakly positive impact on firm performance. They find that the excess compensations are associated with poor firm performance in the future (based on return on assets) which they interpret as suggesting cronyism or mutual back-scratching. That

is, excess directors' compensation compromises the directors' independence and leads to overpayment of CEOs and poor firm performance in the future.

The matter of contradictory results aside, I will follow the pattern of the recent research and include a firm governance index in my models (this is discussed in more detail in Section 4).

2.3.2 Managerial Incentives

Compensation policies, in particular the incentive component of compensation, set by boards can play an important aspect of internal governance in addressing the potential agency problems between stockholders and CEOs. During the 1980s and 1990s, academics and practitioners alike argued in favor of equity-based compensation to better align the interests of stockholders and CEOs. Jensen and Murphy (1990a) and Yermack (1995) each provide empirical evidence that CEO compensation is not as sensitive to stockholder returns as is, in their opinions, necessary to control for the potential agency problems. The research paper by Jensen and Murphy (1990a) led to an article by Jensen and Murphy (1990b) that was published in the *Harvard Business Review*. These research papers and the article, coupled with the support of compensation consultants, may have contributed to some degree at least to the increased use of equity-based compensation for executives throughout the 1990s.

The increased use of equity-based compensation is clearly evidenced by the following information. Murphy (1999) presents equity-based compensation data, in 1996 constant dollars, for CEOs of S&P 500 firms for the period of 1970 to 1996. The equity-based compensation as a percent of total compensation increased from 0% (1970) to 5%

(1976) to 20% (1980) to 28% (1990) to 45% (1996). It is interesting and curious that CEOs received very little of their total compensation in the form of equity-based compensation prior to Jensen and Meckling (1976) . Research by Hall (2003) tells a similar story as the author reports that, in 1984, less than one-half of the CEOs of publicly traded U.S. corporations were granted stock or stock options in a given year and equity-based compensation comprised less than 1% of total CEO pay for the median firm. By 2001, equity-based compensation accounted for approximately two-thirds of total CEO pay for the median firm.

Whether or not it is coincidental to Jensen and Meckling (1976), Jensen and Murphy (1990a), and Jensen and Murphy (1990b), it is clearly evident that the equity-based portion of CEO compensation has increased dramatically since the early 1970s. Another possible explanation for the proliferation of stock option grants relates to the technology boom of the 1990s. So-called "new economy" firms (high-tech and dot-com firms) used large stock option grants in lieu of cash to recruit top managers from "old economy" firms. Consequently, old economy firms were forced to use more stock option based compensation in order to retain top management. During the boom, these stock option grants for both the old and new economy firms were extremely valuable.

As stated by Murphy (2002) the compensation practices of new economy firms had a strong influence on all other firms in the 1990s, as stock options became an increasingly large component of compensation packages. Many agree that because of the favorable accounting treatment, that stock option were not expensed in the year of grant, the stock options seemed a cheap way of enhancing compensation and the competitive recruitment pressures pushed the size of stock option grants. The influence of new

economy firms on executive compensation practices in the 1990s also fits the collapse of the technology bubble (new economy firms) in 2000 leading to a subsequent decline in executive compensation. Jensen and Murphy (2004) report that the average compensation of CEOs of the S&P 500 firms fell after the market crash in 2000 and by 2002, the percentage of stock-related compensation fell as well.

This growth in the use of stock options as a component of executive compensation has become extremely controversial and openly debated. Proponents make the argument that the use of stock options better aligns CEO's wealth with stockholders' wealth, which reduces the potential agency problems. Detractors make the following counter arguments: (1) there is a disconnection between CEO compensation and firm performance, (2) CEOs have no downside risk if the stock options expire out of the money, (3) the open ended upside potential of the stock options (with no downside risk) give the CEO incentive to take excess business risk and to fraudulently manipulate the firm's stock price. There has been much research on each of these counterarguments but the following review focuses only on the landmark and recent research on the relationship between executive compensation and firm performance.

Mehran (1995) finds a positive and statistically significant relationship between CEOs' equity-based compensation and firm performance (using both Tobin's Q and return on assets). Jensen and Murphy (1990a) find a statistically significant relationship but weak economic relationship, in their opinion, between changes in stockholder wealth and changes in CEO's wealth. Hall and Liebman (1998) find a strong relationship between percentage change in firm value and CEO compensation, particularly the equity-based compensation component. Core, Holthausen and Larcker (1999) find that excess

compensation has a negative relationship with subsequent firm operating performance and stock returns.

Bebchuk and Grinstein (2005) find a positive relationship between CEO compensation (both equity and non-equity based compensation) and lagged firm performance (both return on assets and stockholder return). Brick, Palmon and Wald (2006) find a negative relationship between subsequent year excess returns and both CEO and director total compensation. A quote from Core, Guay and Larcker (2003) provides a nice summary description of the results of the research on the relationship between firm performance and CEO compensation, “There is presently no theoretical or empirical consensus on how stock options and managerial equity ownership affect firm performance.”

One of the issues with the aforementioned research is that the papers published prior to 2000 had limitations in the data sets. Mehran (1995) performs cross-sectional analysis of the relationship between executive compensation, ownership structure, and firms’ performance based on the average of 1979 and 1980 data for 153 randomly selected manufacturing firms. Mehran (1995) had several interesting findings but obviously we gain no insights on the temporal relationship between executive compensation and firm performance.

The Jensen and Murphy (1990a) use several data sets of which one is based on all 2,213 CEOs listed in the Executive Compensation Surveys published in Forbes from 1974 to 1986. An obvious limitation to this data set is that the Forbes definition of total compensation does not include any value for newly awarded stock options or the value recognized from the exercise of stock options. While stock options were not as

commonplace then it was still a significant portion of the CEOs compensation. The authors recognized this limitation of the data set and hand collected stock option information on a sample of 73 manufacturing firms for the period 1969 to 1983. The obvious trade off here is a more thorough measure of changes in CEO wealth but for fewer firms.

The Core, Holthausen and Larcker (1999) data set was for 205 publicly traded firms for the years 1982, 1983, and 1984. The data was provided by a major compensation consultant and was rich in the specifics of the executives' compensation. The authors actually cite three advantages to this data set: (1) the data set predates the controversy over corporate governance and thus potentially provides more powerful tests of the importance of corporate governance, (2) the availability of a long time series of subsequent firm performance, and (3) the detail of the compensation components. This would be a great data set if the compensation were extended for much longer than just three years.

The Hall and Liebman (1998) data set contained executive compensation and firm performance information on 478 firms for the period of 1980 through 1994. This is another rich data set but even it has shortcomings as it overlays a particularly robust period in the stock market. The ideal data set would cover about 50 years of history comprising several bull and bear cycles in the stock market and provide extensive history of executive compensation and firm performance prior to and throughout the period of the abundant use of stock options. Unfortunately, that data set is unobtainable!

Mr. Biggs, former Chairman and CEO of TIAA-CREF, and Mr. Bogle, founder of The Vanguard Group, are not academic researchers. However, both are well revered in

the investment community and both have been very vocal with their opinions regarding managerial incentives, particularly equity-based compensation. Biggs (2005) quotes a report from The Conference Board Commission on Public Trust and Private Enterprise that described the 1990s as a “perfect storm – a confluence of events in the compensation area which created an environment ripe for abuse”. Biggs (2005) notes two important elements of the report were the sometimes extraordinary payments made to leaders of failing companies and the dramatic windfalls given to almost all executives during the 1990s. The following quote from Bogle (2005) summarizes his opinion regarding equity-based compensation, “It is said that stock option plans align the interests of managers with the interests of the owners. Seldom has a more untoward lie been foisted on the American public. Options do no such thing. They have a lottery-like benefit because executives do not hold their stock. Academic studies have shown that as soon as their options vest, executives exercise the options and proceed to sell the shares almost immediately. Executives are not stockholders; they're gamblers in the stock market lottery.”

2.3.2.1 Arm's Length Contracting

Corporate governance theory states that boards set CEO compensation as guided by stockholders interests and therefore operate at arm's length from the CEOs whose compensation they set. This notion that boards contract CEO compensation at arm's length is a fundamental premise in the corporate world and in most academic research. In the corporate world, this premise serves as the basis for laws, public policy, and justification of the boards' compensation decision to stockholders, policymakers, and courts. However, some researchers have considered the disconnection between CEO

compensation and firm performance to be an arm's length contracting (or 'optimal contracting') problem. A review of this line of research follows but unfortunately the findings are inconsistent.

Morck, Shleifer and Vishny (1988) found an inconsistent relationship between the level of top managements' and the boards' percentage ownership of the firm with firm performance (Tobin's Q). This and any other research that does not find a consistent positive relationship between CEO compensation and firm performance implies either implicitly or maybe even explicitly that the process for contracting CEO compensation is largely inefficient and therefore does not minimize agency costs. However, this point of view that most boards are contracting CEO compensation inefficiently is difficult to accept because the labor market, the stock market, and the market for control should work to correct such inefficiencies. Others such as Fama (1980) argue the opposing point of view that transactions costs in the aforementioned markets are so small that all agency costs are eliminated. However, this point of view overlooks the information and contracting costs, and the frictions in the markets.

Later research by Shleifer and Vishny (1997) and Murphy (2002) develop theories that incorporate the attractive features of these opposing views. They argue that firms in general contract optimally, but that transaction costs prohibit continuous re-contracting for the frequent changes in the relationship between the parties involved in the contracts. Since contracting is not continuous, the terms of firms' contracts gradually deviate from the optimal arrangement. Contracting theory models such as from John and John (1993) predict that in situations with an increase in the agency costs of equity and a decrease in the agency costs of debt should lead to an increased use of stock option based

compensation. This theory is supported by the research by Bryan, Nash and Patel (2006) which provides evidence of an increase in the agency costs of equity and a decrease in the agency costs of debt from the beginning to the end of the 1990s which in turn supports the increased use of stock option based compensation throughout the 1990s.

A strain of research investigates the agency problems that could lead managers to over-invest (empire-building to gain private benefits) or under-invest (shirking duties to avoid personal costs) in projects. Certainly stockholders and boards want to eliminate or at least minimize these agency problems, since both managers' private benefits and private costs can ultimately reduce firm value. An obvious method for addressing these agency problems is through the optimal contracting of managements' incentives. Some research finds that managers are empire-builders to gain private benefits such as additional compensation and more prestige. Jensen (1986) and Jensen (1993) argue that managers invest in negative net present value projects because the managers derive private benefits from controlling more assets. Along the same lines, Hennessy and Levy (2003) find that managers continue to invest in projects even after investing in all available positive net present value projects.

Other research finds that managers shirk duties associated with investing in projects to avoid the incremental work associated with managing additional assets. Bertrand and Mullainathan (2003) find that when new laws are implemented that protect a firm from the threat of takeover that both the destruction of old plants and the construction of new plants falls. This suggest that managers under-invest to shirk the incremental duties associated with tearing down old plans and building new plants. Aggarwal and Samwick (2006) use an optimal contracting model to show that the

relationship between firm performance and managerial incentives, in isolation, is insufficient to determine whether or not managers have private benefits associated with empire-building. This leads the authors to estimate the joint relationships between incentives and firm performance *and* between incentives and investment. This approach provides results showing that investment is increasing in incentives and that firm performance is increasing in incentives. Taken together, these results are consistent with managers having private costs of investment and that the agency problem of underinvestment is mitigated through the use of optimal incentive contracts.

2.3.2.2 Tournament Theory

This paragraph on tournament theory paraphrases comments made in Gordon (2005). The author notes that a body of labor research views CEO compensation as part of the prize for winning a "tournament" against other managers and that the prize includes rewards for the prior effort of all competing managers. These tournaments for promotion occur in situations where it is difficult to accurately measure individual performance among competitors for the promotion. Therefore, firms implicitly promise to promote and reward the winner of the tournament. In keeping with this theory, the competitors contribute a portion of their current implicit wage in order to have the opportunity to compete in the tournament for a better position with greater compensation. All of this suggests that the optimal CEO compensation package might very well consist of rewards for not only current and future performance but also for the firm's past performance as part of the prize for winning the tournament.

2.3.3 Capital Structure

The following reviews the literature on capital structure from two perspectives: agency problems of debt and agency problems of equity.

2.3.3.1 Agency Problems of Debt

Theory suggests that increasing levels of debt can act as a self-enforcing governance mechanism as increasing levels of debt forces managers to use discretionary cash flow to satisfy interest and principle payments rather than on selfish pursuits such as empire-building or perquisites. Research by Grossman and Hart (1982) and Jensen (1993) confirms that debt mitigates the potential agency costs of free cash flow. Allen and Gale (2000) make the counter-argument that most firms can easily meet interest and principle payments and also note that firms often rely on internal financing.

Yermack (1995) and Bryan, Hwang and Lilien (2000) use the firm's leverage (debt to equity ratio) as a proxy for evaluating the agency problems of debt. Bryan, Nash and Patel (2006) argue that proxies that pinpoint specific conflicts between stockholders and bondholders should provide greater insights than the leverage variable. Therefore, Bryan, Nash and Patel (2006) develop separate proxies for three specific agency problems of debt: underinvestment, asset substitution, and firm financial distress. I discuss these three specific agency problems of debt in order.

2.3.3.1.1 Underinvestment

Myers (1977) identifies a potential underinvestment problem for highly leveraged firms with relatively more growth opportunities. These highly leveraged firms will need an equity infusion in order to have the capital to invest in the growth opportunities: while an equity infusion is certainly acceptable to the bondholders it may not be attractive to

the stockholders. If the stockholders decide against an equity infusion then the firm has an underinvestment problem. However, Myers (1977) suggests that firms with relatively more growth opportunities that use shorter term debt, which is lower risk to the bondholders, should be able mitigate this underinvestment problem more effectively than similar firms that use more long term debt, which has higher risk to the bondholders. That is, firms with a lower risk capital structure should have better opportunities to raise new capital.

Begley and Feltham (1999a) contend that while increasing levels of equity-based compensation can better align stockholder and manager interests it can exacerbate the underinvestment problem because management will become more protective of the stockholders, including managements, capital. This suggests that firms with relatively more growth opportunities and that also use shorter term debt can use greater amounts of equity-based compensation than similar firms with longer term debt. This is possible since the firms with shorter term debt have less of an underinvestment problem from their capital structure and can issue more equity-based compensation and still have less overall of an underinvestment problem than similar firms with longer term debt. This is confirmed by Bryan, Nash and Patel (2006) that find a statistically significant positive relationship between their proxy for short term debt and the use of stock option based compensation for the sub-sample period of 1992 to 1995. However, the coefficient is not statistically significant for their full sample period of 1992 to 1999 or the sub-sample period of 1996 to 1999.

2.3.3.1.2 Asset Substitution

Asset substitution is when stockholders in a leveraged firm expropriate wealth from bondholders by switching investments from safer to riskier projects. The theory is that the riskier projects have more upside potential than the safer projects and the shareholders stand to gain more from any realized upside potential than do the bondholders. John and John (1993) contend that the issuance of convertible bonds mitigates the asset substitution problem because it reduces the opportunity to transfer wealth from the bondholders to the stockholders. The reason is because the convertible bondholders have the option to become stockholders and participate in any increase in the stock price. The asset substitution problem is potentially greater for firms with relatively more growth opportunities because there are more opportunities for the stockholders to expropriate wealth from the bondholders. Combining the two strains of logic suggests that firms with relatively more growth opportunities can mitigate the agency costs of asset substitution by using more convertible debt.

On another front, John and John (1993), Yermack (1995) and Begley and Feltham (1999a) argue that asset substitution is increasingly more likely as management receives increasing levels of equity-based compensation. Management has the inside information on the risk level of the projects and can invest in the riskier projects to expropriate wealth for themselves. Incorporating this logic suggests that for firms with relatively more growth opportunities, using relatively more convertible debt mitigates the asset substitution problem and can therefore issue more equity-based compensation and still have less overall of an asset substitution problem than similar firms with relatively less convertible debt. The reason a firm wants to even issue the equity-based compensation at

all is to; in theory at least, better align the stockholders and the managers' interests, even though as noted above increased levels of equity-based compensation can lead to an asset substitution problem. Since convertible debt mitigates the asset substitution problem for firms with relatively more growth opportunities, Bryan, Nash and Patel (2006) expect and find a statistically significant positive relationship between their convertible debt and growth opportunity interaction term and the use of stock option based compensation for their full sample period of 1992 to 1999.

2.3.3.1.3 Financial Distress

Circumstances where it is uncertain that bondholders will receive contracted payments from the firm lead to conflicts between bondholders and stockholders. Since financial distress restricts a firm's ability to make the contracted payments to the bondholders infers that financial distress exacerbates the agency problems of debt. Therefore, firms prone to financial distress should design CEO compensation such that the CEO's interests are aligned with the interests of the bondholders. That is, firms with a greater propensity for financial distress should use more non-equity based compensation and firms less prone to financial distress can use more equity-based compensation. Bryan, Nash and Patel (2006) measure the likelihood of financial distress by calculating the Z-score for each firm; see Altman (1993) for an explanation of the Z-score. Bryan, Nash and Patel (2006) find the expected negative relationship between the likelihood of financial distress and the use of stock option based compensation for some but not all of their cases.

2.3.3.2 Agency Problems of Outside Equity

Bryan, Nash and Patel (2006) develop separate proxies for five specific agency problems of equity: namely, managerial shirking, monitoring issues associated with growth options, monitoring issues associated with firm size, poor firm performance, and excess free cash flow. I discuss these five specific agency problems of equity in order.

2.3.3.2.1 Managerial Shirking

The separation of ownership and control provides opportunities for CEOs to exert less than maximum effort, which is known as shirking. An aspect of a CEO's utility is the exertion of effort and even if the CEO is a workaholic presumably less exertion is better than more. Contracting theory suggests that equity-based compensation may mitigate agency problems of outside equity, including shirking, between CEOs and stockholder wealth.

John and John (1993) note that the capital market (external governance) mitigates the agency problems of outside equity by directly monitoring and disciplining managers for expropriation of stockholder wealth. That is, management knows that if they are subject to scrutiny by external monitors then they need to avoid the appearance of shirking duties. Comment and Jarrell (1995) argue that a firm's ratio of short term debt (less than one year to maturity) to total debt is an indication of a firm's reliance on external capital markets and its frequency of accessing the capital market to refinance the short term debt. The firms with higher ratios of short term debt to total debt should be more frequently monitored in the external capital markets and therefore should have lower agency problems of outside equity. Furthermore, a firm that is more frequently monitored by external oversight should require less equity-based compensation to align

the interest of the CEO with the stockholders. Bryan, Nash and Patel (2006) find the expected negative relationship between the ratio of short term debt to total debt and stock option based compensation for the sub-sample period of 1996 to 1999.

2.3.3.2.2 Growth Options

Jensen and Meckling (1976) argue that the level of a firm's agency costs is influenced by the amount of managerial discretion in decision making and the cost of measuring managerial performance. Along the same lines, Bryan, Hwang and Lilien (2000) contend that firms with relatively more growth options have broader informational asymmetries, insiders know more than the outsiders, that create more opportunities for managers to expropriate wealth. The inference of these papers is that firms with relatively more growth options are likely to be more difficult to monitor and therefore may have greater potential for agency problems of equity. Bryan, Nash and Patel (2006) argue that firms with relatively more growth opportunities (larger market-to-book ratio) and presumably more difficult to monitor, should use more stock option based compensation to better align the interests of management with the stockholders. Bryan, Nash and Patel (2006) find a statistically significant and positive relationship between their proxy for growth options and stock option based compensation for all of their cases.

2.3.3.2.3 Firm Size

Yermack (1995) and Bryan, Hwang and Lilien (2000) find a positive relationship between firm size and the level of managements' stock option based compensation. These authors attribute this relationship to the idea that the difficulty for external markets to monitor management is increasing with firm size. Therefore, since presumably larger firms are more difficult to monitor, Bryan, Nash and Patel (2006) predict and find a

positive relationship between firm size and stock option based compensation for all of their cases.

2.3.3.2.4 Firm Performance

Stockholders of a firm stand to profit when the firm's performance meets or exceeds the market's expectations, which implies that the stockholders should link managements' compensation to firm performance. This suggests that stockholders might increase managements' level of equity-based compensation when firm performance falls short of the market's expectations. Consistent with this notion, Bryan, Nash and Patel (2006) argue that firms with lower abnormal firm performance should use more stock option based compensation. Bryan, Nash and Patel (2006) find a statistically significant and positive relationship between their proxy for firm performance (return on assets) and stock option based compensation for their full sample period of 1992 to 1999 and the sub-sample period of 1996 to 1999.

2.3.3.2.5 Free Cash Flow

Jensen (1986) argues that agency problems are increasing with free cash flow since discretionary free cash flow may be invested in negative NPV projects (empire-building) or on management perquisites. Consistent with contracting theory, providing management with equity-based compensation should motivate managers to optimally utilize excess free cash flow and maximize stockholder wealth. Along these lines, Bryan, Nash and Patel (2006) expect and find a statistically significant and positive relationship between their proxy for free cash flow and stock option based compensation for their full sample period of 1992 to 1999 and the sub-sample period of 1996 to 1999.

2.3.3.2.6 Summary of Bryan, Nash and Patel (2006)

In summary of the research by Bryan, Nash and Patel (2006), the authors consider the link between compensation and the agency costs of debt and the link between compensation and the agency costs of equity. The authors note that, even though contracting theory predicts that greater levels of equity-based compensation decreases the agency problems of outside equity, it may aggravate the agency problems of debt. The authors argue that while the agency costs of debt declined during the 1990s (with the tremendous increase in equity, the debt to equity ratio fell throughout the 1990s), the attendant decline in external oversight increased the agency costs of equity. The authors conclude that the net effect of these changes explains why more firms used equity-based compensation in the latter portion of the 1990s and why the proportion of equity-based compensation increased throughout the 1990s.

2.3.4 *Bylaw and Charter Provisions*

According to Gillan (2006) certain corporate governance features such as poison pills and staggered boards operate as deterrents to the market for corporate control. The argument in favor of these features is that they force potential acquirers to negotiate with the incumbent board and executives to ensure the current stockholders receive an acceptable price for their shares. The undesirable tradeoff is that such features may undermine the external oversight provided by the market for corporate control. Malatesta and Walkling (1988) and Reingaert (1988) find negative abnormal returns surrounding the adoption of anti-takeover measures, which implies that the stock market is indeed concerned about the loss of external oversight provided by the market for control.

Drilling deeper than prior research, Brickley, Coles and Terry (1994) find that stock market reactions to the adoption of anti-takeover measures depends on board structure as they find a positive market reaction associated with independent boards and a negative market reaction associated with less independent boards. This suggests that the stock market views the oversight of an independent board as a substitute for the loss of external oversight by the market for control. However, the stock market is concerned about the loss of external oversight provided by the market for control when the board lacks independence.

Gompers, Ishii and Metrick (2003) use 24 distinct corporate governance provisions to build a governance index as a proxy for shareholder rights. They find the expected correlation between the governance index and stock returns during the 1990s, specifically finding that an investment strategy that bought firms with the strongest shareholder rights and sold firms with the weakest shareholder rights earned an abnormal 8.5% return. However, Gompers, Ishii and Metrick (2003) note that while their findings are indicative of associations between corporate governance and firm performance, they can not draw any conclusions regarding causality.

Core, Guay and Rusticus (2006) also find that firms with weak shareholder rights underperform the market but their results do not support the theory that weak corporate governance causes poor stock performance. Danielson and Karpoff (2006) focus on companies that adopt poison pills prior to widespread implementation of state laws affording firms anti-takeover protection. Contrary to the opinion that the adoption of poison pills leads management to shirk duties and entrenchment, they find that firms

experience modest operating performance improvements during the 5-year period after the adoption of the poison pill provision.

2.3.5 Managerial Power

Bebchuk and Fried (2004), Bebchuk, Fried and Walker (2002), Bebchuk and Fried (2003), Bebchuk and Fried (2005), and Bebchuk and Grinstein (2005) provide a description of how managerial power or influence has shaped the structure of executive compensation in publicly traded U.S. firms. They argue that the presence of managerial power can explain much of the current structure of executive compensation, including features that have long perplexed financial economists. The authors also show that managerial influence over the structure of executive compensation which has produced a considerable transfer of wealth from stockholders and the economy to management. Furthermore, they argue this managerial power has led to components of compensation that weaken managers' incentives to increase stockholder wealth and may even provide perverse incentives to reduce stockholder wealth.

As an author's note, many of the comments in this section on managerial power stem from the work by Drs. Bebchuk, Fried, Grinstein, and Walker.

2.3.5.1 Limits of the View on Arm's Length Contracting

Bebchuk and Fried (2005) argue that similar to the agency conflict between stockholders and management, there is potential for agency conflict between stockholders and directors of the board. The authors contend that directors have had and continue to have various incentives to support arrangements that favor management over the stockholders. The authors discuss a variety of social and psychological factors such as

collegiality, team spirit, a natural desire to avoid conflict within the board, friendship and loyalty, and cognitive dissonance that support their position. I review the ten reasons that Bebchuk and Fried (2005) present for limits to arm's length contracting of executive compensation in the following sub-sections.

2.3.5.1.1 Incentives to be Re-elected

Bebchuk and Fried (2005) argue that directors' desire to be re-elected to the board creates an incentive to support the CEO's compensation package, a matter that is extremely important to the CEO, as long as the compensation can be reasonably justified. Furthermore, a director does not want to develop a reputation for blocking compensation arrangements sought by executives for concern of not being invited to join other boards. The authors' argue that besides attractive compensation, a directorship also provides prestige and valuable business and social connections. They further argue that both the financial and non-financial benefits of holding a board seat provide directors incentive to act in such a fashion to have the best opportunity of retaining their position. In a world where stockholders select individual directors, the directors would have incentive to develop a reputation of serving the stockholders. However in practice, the director slate proposed by management is typically the only slate voted on by stockholders. Since the CEO has significant influence (power) over the nomination process of the slate of directors, displeasing the CEO over compensation or any other matter can potentially hurt a director's chances of being put on the firm's slate and re-elected.

2.3.5.1.2 CEO Power to Benefit Directors

Bebchuk and Fried (2005) argue that if the CEO is generous with compensation and treatment of the directors then the board is more likely to support generous compensation and treatment for the CEO, and vice versa. This is known as back scratching or cronyism. Brick, Palmon and Wald (2006) find that excess director compensation leads to excess compensation for the CEO and poor future firm performance, which is evidence of cronyism at the expense of the stockholders.

2.3.5.1.3 Friendship and Loyalty

Bebchuk and Fried (2005) note that a director may have a professional, personal or social connection to the firm's CEO or other executives; which may cause the director to have a strong sense of loyalty to the executives. The authors point out that even those directors who do not know any of the firm's executives prior to taking the position may have a stronger sense of loyalty to the executive team that they will be working with on a routine basis than to the stockholders.

2.3.5.1.4 Collegiality and Authority

Bebchuk and Fried (2005) argue that in addition to friendship and loyalty, there are other social and psychological factors that make it difficult for directors to resist generous executive compensation packages. Directors are generally expected to treat their fellow directors, including the firm's CEO and other firm executives that sit on the board, collegially. The CEO is also the firm's leader, the person whose decisions and visions should have the most influence on and authority over the firm's future direction. For these reasons the directors often treat the CEO with respect and deference which can make it awkward for the directors to negotiate the CEO's compensation contract at arm's

length. In fact, Holmstrom (2005) provides anecdotal evidence that firms may even want to avoid arm's length bargaining so as not to damage relations with the firm's CEO. Holmstrom (2005) argues that compensation is a sensitive matter and that the board may prefer to benchmark rather than risking potentially contentious negotiations with the CEO.

2.3.5.1.5 Cognitive Dissonance and Solidarity

Bebchuk and Fried (2005) note that many members of compensation committees are logically current or former executives themselves and may have developed views about executive compensation consistent with their own self interest. That is to say, they are likely to support a compensation package for the CEO that is in line with how they themselves have been or would like to be compensated.

2.3.5.1.6 The Small (to the directors) Cost of Favoring Executives

Bebchuk and Fried (2005) point out that the independent directors of public firms may own only a small fraction of the firm's stock and consequently there is little direct cost to the directors to support a generous compensation package for the CEO.

2.3.5.1.7 Ratcheting

According to Bebchuk and Fried (2005) the practice of many boards to compensate their CEO more than the industry average is a broadly recognized contributing factor to the rise in executive compensation. Murphy (1999) suggests this widespread practice has led to an ever-increasing average and a continuous escalation of executive pay.

2.3.5.1.8 Limits of Market Forces

Bebchuk and Fried (2005) find fault with the argument that even if directors are influenced by the CEO, market forces will cause boards and executives to adopt compensation arrangements equivalent to what would have been contracted under arm's length negotiations. The authors' argue that market forces are neither sufficiently fine-tuned nor sufficiently powerful to compel such outcomes. They acknowledge that markets for capital, corporate control, and managerial labor do impose some constraints on executive compensation. However, they go on to argue that these constraints are limited and allow significant deviations from the equivalent compensation package produced from arm's length contracting.

2.3.5.1.9 New CEOs

Bebchuk and Fried (2005) argue that all of the foregoing limitations still potentially apply to CEOs hired from outside of the firm even though the negotiations with new CEOs hired from outside of the firm may be closer to arm's length negotiations than with incumbent CEOs.

2.3.5.1.10 Firing of Executives

Jenkins (2002) concludes that the increased willingness of directors to fire CEOs over the past decade provides evidence that boards do indeed deal with CEOs at arm's length. However, according to Bebchuk and Fried (2005) instances of firing a CEO are still limited to circumstances in which the CEO is accused of legal or ethical violations or is viewed by stockholders and directors as having dismal performance. Without such extenuating circumstances, mere mediocrity is far from enough ammunition for a board to fire a CEO. Bebchuk and Fried (2005) point out that in cases in which boards do fire

the CEO, boards often provide the departing CEO with compensation well beyond what is required by the contract to soften the blow and alleviate the directors' guilt and discomfort. They go on to argue that boards' track record of dealing with underperforming CEOs does not support the view that boards treat CEOs at arm's length.

2.3.5.2 Managerial Power and Pay Relationships

Bebchuk and Fried (2005) acknowledge that although CEOs generally have some degree of influence over their boards, the extent of each CEO's influence is a function of their respective firm's governance structure. Their managerial power theory predicts that executives who have more power should receive higher compensation, or at least compensation that is less sensitive to firm performance, than their less powerful counterparts. The authors indicate that there is a substantial body of evidence that supports their theory.

First, there is evidence that CEO compensation is higher when the board is relatively weak. Core, Holthausen and Larcker (1999) find that CEO compensation is higher (1) when the board is large, which makes it more difficult for directors to organize in opposition to the CEO; (2) when more of the outside directors have been appointed by the CEO, which could cause them to feel gratitude, obligation, or loyalty to the CEO; and (3) when outside directors serve on three or more boards, and thus are more likely to be busy (distracted). Cyert, Kang and Kumar (2002) find CEO pay is 20% to 40% higher if the CEO is the chairman of the board, and it is negatively correlated with the stock ownership of the compensation committee members.

Second, studies find a negative correlation between the presence of a large outside stockholder and compensation arrangements that favor CEOs. A large outside

stockholder might engage in closer monitoring and thereby reduce CEOs' managerial power (influence) regarding their compensation. Cyert, Kang and Kumar (2002) find a negative correlation between the equity ownership of the largest stockholder and the amount of CEO compensation. More specifically, they find that doubling the percentage ownership of a large outside stockholder is associated with a 12% to 14% reduction in a CEO's non-salary compensation. Bertrand and Mullainathan (2000) find that CEOs in companies without a 5% (or larger) outside stockholder tend to receive more "luck-based" pay; that is, compensation associated with increases in profits that are generated entirely by external factors (for example, changes in oil prices and exchange rates) rather than by CEOs' own efforts. This study also finds that companies lacking large outside stockholders, the boards make smaller offsetting reductions in cash compensation when they increase CEOs' stock option based compensation.

Third, there is evidence linking CEO compensation to the concentration of institutional stockholders, which are more likely to monitor the CEO and the board. Hartzell and Starks (2003) find that more concentrated institutional ownership leads to lower and more performance sensitive compensation. Parthiban, Kochar and Levitas (1998) find that the effect of institutional stockholders on CEO pay depends on the nature of their relationships with the firm. The authors report that CEO compensation is negatively correlated with the presence of "pressure resistant" institutions, institutions that have no other business relationship with the firm and thus presumably are concerned only with the firm's share value. But they find that CEO compensation is positively correlated with the presence of "pressure sensitive" institutions, institutions that have

business relationships with the firm (for example, managing its pension funds) and are thus more susceptible to managerial power.

Finally, studies find a connection between pay and anti-takeover provisions, arrangements that make CEOs and their boards less vulnerable to a hostile takeover. Borokhovich, Brunarski and Parrino (1997) find that CEOs of companies adopting anti-takeover provisions enjoy above market compensation before adoption of the provisions and that adoption is followed by further significant increases in compensation. This pattern is not readily explainable by arm's length contracting. Indeed, if risk-averse managers' jobs are more secure, stockholders should be able to pay the managers less. Cheng, Nagar and Rajan (2005) find that CEOs of companies that became protected by state anti-takeover legislation enacted during the period from 1984 to 1991 reduced their holdings of shares, which became less important for the purpose of maintaining control, by an average of 15%. Arm's length contracting, by contrast, might predict that CEOs protected by anti-takeover legislation would be required by their boards to increase their stockholdings to restore their incentive to generate stockholder value.

In closing this section on internal governance I quote from Hubbard (2005): “there is very little evidence in the data that suggest that simply changing a governance mechanism, like share ownership or independent directors, has much effect on firm value. This pattern simply indicates that markets try to get it right across an entire range of mechanisms.” I do not take this statement to mean that internal governance does not matter. To me it means that the tremendous increase in CEO compensation was a change in a governance mechanism intended to mitigate the agency problem between the CEO and the stockholders. The question is did we get it right or is it wrong?

2.4 External Governance

This sub-section reviews the following aspects of the corporate governance system that are *external* to the firm: laws and regulations, capital markets (ownership structure), market for corporate control, labor markets, and external oversight (private sources).

2.4.1 Laws and Regulations

Laws and regulations are integrally related to corporate governance, and a large body of research studies the link between corporate governance, the law, and finance. La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) focus on corporate governance and how it relates to the legal protections afforded to stockholders and creditors. The authors find that differences in countries' laws account for differences in the breadth and depth of countries' financial markets and in the ability of firms to access external capital. Daouk, Lee and Ng (2006) examine the link between capital market governance (CMG) and several key measures of market performance. Using detailed data from individual stock exchanges, the authors develop a composite index that captures three dimensions of security laws: the degree of earnings opacity, the enforcement of insider trading laws, and the effect of removing short selling restrictions. The authors find that improvements in the CMG index are associated with decreases in the cost-of-equity, increases in market liquidity, and increases in market pricing efficiency.

Denis, Hanouna and Sarin (2006) ask if there is a dark side to incentive compensation. Put simply, their answer is yes. After controlling for other elements of compensation and possible determinants of fraud, the authors find a positive association

between the use of stock options and allegations of fraud. Using a matched sample procedure, the authors report a positive association between measures of stock option intensity and class action lawsuits for securities fraud. Expanding the analysis to include ownership structure, they find the link between stock option use and alleged fraud is stronger in firms with higher outside block and institutional ownership. The authors' interpretation of this finding is that the incentive to engage in fraudulent activity is heightened by the presence of block and institutional owners who may also benefit from the fraud. The authors argue that in firms with higher stock option compensation, the CEO benefits in two ways from fraudulent activities that increase stock price: (1) CEOs benefit directly from an increase in their compensation and (2) CEOs benefit indirectly by lowering the probability of dismissal.

2.4.2 Capital Markets (Ownership Structure)

The relation between ownership structure and CEO compensation has been studied with conflicting results. Holderness and Sheehan (1988) find that managers who are majority owners receive marginally higher salaries than other managers. Allen (1981) finds level of CEO compensation is a decreasing function of the equity held by the CEO (and family) as well as the level of equity holdings by board members not related to the CEO. Lambert, Larcker and Weigelt (1993) find CEO compensation is lower when the CEO's ownership is higher and when a director other than CEO has ownership greater than 5%. Core (1997) finds that CEO compensation is increasing in insider control of share votes and decreasing in insider ownership of the firm.

Others have studied the relationship between ownership structure and firm value and performance. Morck, Shleifer and Vishny (1988) demonstrate that firm value first rises with increases in inside ownership as the desired alignment effect of share price dominates, then falls as the managerial entrenchment effect of insider voting control becomes stronger. Shivdasani (1993) finds that hostile takeovers are more likely when target outside directors own less equity and serve on fewer boards and when there are unaffiliated outside block-holders of stock. Holthausen and Larcker (1996) indicate that performance subsequent to the initial public offering of a previously leveraged buy-out is positively associated with the change in the equity stake of both the significant non-management investors and the operating management of the firm. Yermack (1996) finds that firm value is significantly higher when officers and directors have greater ownership, although this ownership variable has an ambiguous relation with contemporaneous measures of accounting operating performance.

Other research focuses on the influence of institutional and block-holder ownership. Bethel, Liebeskind and Opler (1998) and Hartzell and Starks (2003) report evidence consistent with the view that block-holders and institutions play an important role in limiting agency problems between managers and other investors. However, Colvin (1998) contends that institutional investors overreact to negative earnings news and consequently force managers to be overly concerned about short-term earnings. Consistent with this view, Hotchkiss and Strickland (2003) report that the market reaction to negative earnings announcements is stronger in firms with greater institutional ownership.

Berry, Paige Fields and Wilkins (2006) find that as CEO ownership declines, board independence, board seats held by venture capitalists, and unaffiliated block ownership increase. Their findings suggest that as inside ownership decreases alternative governance mechanisms evolve to help mitigate the resulting increase in agency costs.

2.4.3 Market for Corporate Control

According to Gillan (2006), the market for corporate control is the ultimate corporate governance mechanism. As managers compete in the market for control, assets (companies) go to the highest creator of value and the inefficient managers are thusly disciplined. However, the market for corporate control may have two sides to the coin in that it also provides inefficient managers the opportunity to indulge in empire building through acquisitions. According to Bebchuk and Fried (2005), many believed that significant stock option grants would align stockholder and managerial interests and would thereby provide a substitute for the market for corporate control. Additionally, stock options were included into severance arrangements (known as golden parachutes) so that a change in control triggered the immediate vesting of stock options otherwise scheduled to vest over a multi-year period. While the golden parachutes were seen as aligning managerial and stockholder interests at the crucial moment of an uninvited takeover bid, the other side of this coin is that the inefficient manager of the target firm is simply rewarded for poor performance.

2.4.4 Labor Markets

Hubbard (2005) states that executive compensation is often talked about as a stand alone corporate finance topic but he argues that we are really talking about a market for labor in a specific area. The finance literature on labor markets focuses on CEOs, members of senior executive teams, and directors. Classic papers, such as Jensen and Meckling (1976) and Fama and Jensen (1983) argue that labor market forces and reputation concerns have a disciplining effect on both managers and directors. On one hand, solid performance by CEOs and directors has the potential to lead to better opportunities in the future. For example, CEOs may be offered a position at a larger or more prestigious firm or more board seats in the future. On the other hand, poor performance may lead to termination and subsequent difficulties obtaining new positions, either as an executive officer or director. Early empirical work by Coughlan and Schmidt (1985) and Warner, Watts and Wruck (1988) provide a broad perspective on the association between firm performance and the labor market for CEOs. These studies find that good performance is positively associated with CEO compensation, whereas poor performance increases the likelihood of termination or CEO turnover.

Holmstrom (2005) suggests that a reason it may be difficult to explain why executive compensation is so high is because of the dynamic nature of the labor market. Himmelberg and Hubbard (2000) and Murphy and Zabochnik (2004) find empirical evidence suggesting that the rapid rise in executive compensation can be explained as a shift in the demand for top executive talent. They argue that in the second half of the 1990s, executives had lucrative opportunities outside their traditional jobs, as either investors or partners in the red-hot venture and buy-out markets or as entrepreneurs.

Holmstrom (2005) argues that the view that there are many CEO substitutes, which should keep the compensation level under control, is misguided. The author supposes there are many potential CEO substitutes, but the board of directors does not know who they are and where to find them. In this event, a CEO that is performing well and is trusted can be worth much more than the second best alternative.

2.4.5 External Oversight (Private Sources)

One of the primary private sources of external oversight is the media. The media clearly plays an important function in reporting on corporations' performance, activities and matters of governance. For example, Bethany Mclean of *Fortune Magazine* is credited with being the first to publicly reveal the problems at Enron. Finance researchers have also examined the corporate governance role of the media. Notably, Dyck and Zingales (2002) investigate how the media pushes corporate managers and directors to behave in a socially acceptable manner. The authors conclude that the media affects corporations' environmental policies and policies for diverting firm resources to controlling stockholders.

In closing this section, this dissertation follows a literature survey and empirical test format. This survey is intentionally broad as it establishes my foundation and understanding of research that investigates the structure of CEO compensation, the relationship between CEO compensation and firm performance, and the relationship between corporate governance and CEO compensation. However, the survey does not specifically inform this research. The specific literature review that motivates this research is provided in the next section.

3 Development of Empirical Research Hypotheses

The tremendous increase in CEO total compensation and the increased use of and payouts from stock options in recent years has generated considerable debate and concern in boardrooms, in the financial press, and among academics. The following quote from the New York Times nicely portrays the prevailing sentiment regarding this issue. “Corporations have been wrestling for decades with ways to link pay to performance, with little success. In the 1980’s, they tried tying cash bonuses to rising sales or earnings, only to find that the payouts encouraged executives to make decisions that yielded short-term results—and often longer-term disasters. In the 1990’s, companies tried stock options, figuring that they would be the best way to tie the executives’ fortunes to those of shareholders. Instead, they prompted some managers to time decisions to pump up the stock price just when the options vested. Bonuses and options at Tyco and Enron, for example, did little to prevent widespread accounting frauds at either company. The secret to linking pay to performance remains elusive.” Deutsch (2005)

My research extends the literature that investigates the link or connection between CEO (executive) compensation and firm performance. In sub-section 3.1, I describe the components of CEO compensation, provide a brief description of the CEO compensation data used in my dissertation (I more fully describe the complete sample in Section 5), and report changes in the level and composition of CEO compensation during the sample period. As I discuss in sub-section 3.1, CEO compensation has increased dramatically, which raises the question as to whether CEOs’ performance has improved or whether CEOs have become better at extracting personal wealth from their firms. In sub-section 3.2, I point out which components of CEO compensation are potentially disconnected

from firm performance by comparing the components of CEO compensation to the S&P 500 (market) performance during the sample period. Although I do not perform any explicit tests in sub-section 3.2 as to whether there is a disconnection between CEO compensation and performance, a cursory view of the data does pique interest in several possible research questions. In sub-section 3.2 I also review literature that describes potential sources of disconnection between CEO compensation and firm performance. In sub-section 3.3, I review a very specific branch of the literature that suggests a small group of CEOs has an inordinate impact on the overall levels of CEO compensation and the relation between CEO compensation and firm performance. The gaps and unanswered questions in this literature review motivate my empirical research questions as described in sub-section 3.3.

3.1 CEO Compensation

This sub-section describes the components of CEO compensation. It also presents summary information and graphs of CEO compensation to illustrate the significant changes in the level and composition of CEO compensation that have occurred during the 1993-2005 period.

3.1.1 Description of the Components of CEO Compensation

The Board of Directors of a firm has a Compensation Committee that is responsible for setting the compensation package for the CEO and possibly other executives. The principle objective, consistent with agency theory, is for the Compensation Committee to set the CEO compensation such that the CEO has incentives to act in the best interest of

the stockholders. The Compensation Committee may engage a compensation consultant to provide a third party opinion on the appropriate levels of executive compensation. Although there is significant heterogeneity across firms and industries, most CEO compensation packages contain four basic components: (1) a base salary, (2) an annual bonus tied to accounting performance, (3) equity-based compensation (restricted stock grants and stock options), and (4) other compensation (hereafter “Other compensation”), such as perquisites, retirement benefits, loans, and severance packages.

CEOs’ and other executives’ base salaries are typically based on industry and market peer salary surveys. The annual bonus is usually based on achieving certain accounting-based performance measures (for example, level of revenues, earnings, or return on assets) for the immediately preceding fiscal year (or several preceding fiscal years for multi-year plans). Restricted stock is stock granted by a company to an employee with certain restrictions. Typically, the restrictions include a vesting period, a holding period, and possibly performance conditions, such as the company reaching certain earnings per share goals or financial targets. Stock options are contracts, which after vesting (options usually take one to three years to vest) give the holder the right to buy a share of stock at a set exercise price for a certain period of time (typically five to ten years). Also, CEOs and other top executives will often sign employment contracts with the firm which includes a description of the base salary, target bonus payments, severance arrangements in the event of separation or change in corporate control, and other terms.

3.1.2 Summary Information and Graphs of CEO Compensation

The discussion and figures in this sub-section report changes in the level and composition of the components of CEO compensation during the 1993-2005 sample period for the firms in the ExecuComp database (which includes the S&P 1500, firms that were formerly in the S&P 1500, and a small set of other firms chosen by the data provider, Compustat). My base sample (which I describe in detail in Section 5) includes data for 5,210 CEOs and 2,746 firms collected from the ExecuComp database from 1993 through 2005. Roughly speaking, the average firm replaces its CEO once during the sample period ($5,210 \text{ CEOs} / 2,764 \text{ firms} = 1.9 \text{ CEOs per firm}$). However, there is little movement of CEOs from one firm in the sample to another firm in the sample. In fact, only 150 of the 5,210 CEOs ever serve at more than one firm in the sample. This suggests that newly hired CEOs either come from non-CEO positions from firms in the ExecuComp sample or come from firms outside the ExecuComp sample.

Approximately 64% of the CEOs serve longer than three years as the CEO, with a mean CEO tenure of 6.4 years. The firm count per year ranges from 1,622 to 1,996; on average, 95% of the firms survive from one year to the next. The firm life during the sample period has a mean of 8.6 years. These summary statistics suggest that the sample of firms and CEOs are relatively stable and time invariant, which makes it possible to meaningfully compare yearly compensation data from the sample. (I more fully describe the complete sample and its stability in Section 5.)

Before developing specific hypotheses, it will be helpful to begin with an overview of compensation patterns during the sample period. Table 1, Panel A (all tables and figures are in the Appendix), presents annual summary statistics for mean CEO

compensation; all values are adjusted for inflation to 2005 dollars. Because a picture is worth a thousand words, it is more insightful to view this data graphically, beginning with Figure 1.

Figure 1 presents the percent contribution of each of the four major components of CEO total direct compensation: salary, bonus, equity-based compensation (restricted stock grants plus stock options), and Other compensation for all CEOs in my sample. It is interesting to note that the equity-based compensation, as a percent of CEOs' total direct compensation, increased dramatically from 42% in 1993 to 73% in 2000 but curiously dropped in subsequent years to a level of 53% in 2005. This increase and then subsequent decline in the percentage contribution of equity-based compensation could be coincidental to the technology bubble and bust in the stock market. Alternatively, it could reflect stock and labor market forces at work attempting to discover the optimal level of equity-based compensation to minimize agency conflict.

Another curiosity, as shown in Figure 2, is that even the make up of equity-based compensation has changed dramatically since 2001. Stock options contributed 90% of the equity-based compensation in 2001, but their contribution is down to only 64% in 2005 (with of course an exact offsetting increase in the contribution of restricted stock grants). A cynic might say this is because stock options are out of favor and it is now easier to 'hide' compensation in the form of restricted stock grants. Alternatively, it could reflect stock and market forces at work attempting to find the optimal mix of equity-based compensation.

Figure 3 is a stacked bar graph that presents the mean dollar value of each of the four major components of CEO total direct compensation: salary, bonus, equity-based

compensation (the value of restricted stock grants plus stock options), and Other compensation for all CEOs in my sample, all adjusted for inflation to 2005 dollars. Note the large increase in CEO compensation. Even with the decline in mean CEO compensation following the bursting of the technology bubble in 2000, the mean level of compensation in 2005 is still much greater than in 1993. Also, it appears from this graph that the increase in the CEOs' total direct compensation is primarily due to the increase in equity-based compensation.

These data clearly indicate a significant increase in CEO mean compensation. The next sub-section explores potential sources of disconnection between CEO compensation and firm performance.

3.2 Is CEO Compensation Linked to Firm Performance?

This sub-section begins to explore the link between CEO compensation and firm performance and as such is foundation for the questions underlying my empirical research. Although I do not perform any empirical tests in this sub-section, the data I report do point out which components of CEO compensation are potential sources of disconnection between CEO compensation and firm performance, which piques the interest in my research questions. In addition, in this sub-section I review literature that describes potential sources of disconnection between CEO compensation and firm performance.

Is CEO compensation linked to firm performance? A simple comparison of the growth rate in CEO total direct compensation to the annualized return of the S&P 500 index (which is a proxy for the market) for various periods of time suggests the answer is

no. For the period of 1993 through 2000, mean CEO total direct compensation increased at an annualized nominal growth rate of 20.9% per year compared to an annualized nominal growth rate of 16.0% per year for the S&P 500 index (before dividends). The substantially higher growth rate in CEO compensation relative to the S&P 500 index growth rate seems ‘excessive’ and probably unnecessary for addressing any potential agency conflicts. Furthermore, it suggests that CEO compensation may not be properly linked to firm performance from the shareholders’ perspective. This evidence is consistent with the point argued by Bebchuk and Fried (2005) that “executives’ large compensation packages are much less sensitive to their own performance than has been commonly recognized.” For the period of 1993 through 2005 the CEO total direct compensation increased at an annualized nominal growth rate of 10.0% per year compared to an annualized nominal growth rate of 8.5% per year for the S&P 500 index (before dividends). While growth in CEO compensation during the 1993-2005 period was not as high as in the 1993-2000 period, it still may have been more than was necessary to address any potential agency conflicts.

This simple comparison technique certainly is not sufficient to conclude that CEO total direct compensation is not linked to firm performance, but it does raise questions. A similar comparison for each of the four major components of CEO compensation, as described in sub-section 3.1, with firm performance raises even more questions. Figure 4 presents the cumulative nominal increase in each of the four major components of CEO compensation for the period of 1993 through 2005, with each component indexed to 100 in 1993.

First, I focus on the cash components of compensation, salary and bonus, and their relationship to firm performance. Murphy (1999) found the sum of salary and annual bonus increased from \$700,000 in 1970 to \$1,300,000 in 1996, only a 2.3% annual increase above inflation. Referring to Figure 4, the annual plot of mean salary indicates a fairly steady increase for 1993 through 2005 at a nominal rate of 3.7% per year. Also, the annual plot of mean bonus has some fluctuation but generally it depicts a steady upward trend at a nominal rate of 10.0% per year through 2005. Combined, mean salary plus bonus increased from 1993 at a nominal rate of 7.0% per year through 2005. This rate of increase for the combined mean salary plus bonus is comparable to the 8.5% annualized increase (before dividends) in the S&P 500 index from year end 1993 through year end 2005 and the average inflation rate of 2.5% for the same period. These comparisons imply that the cash components of CEO compensation are not likely to be responsible for any disconnection between CEO compensation and firm performance.

Next, I explore the equity-based compensation component of CEO compensation. As stated previously, in the agency theory framework, the intention behind increasing equity-based compensation is to create an efficient compensation contract with the CEO such that the CEO acts to maximize stockholders' wealth. Hall and Liebman (1998) established that much of the increase in CEO total compensation is due to increased use of stock options. According to these authors, the percentage of CEOs receiving stock options awards increased from 30 percent in 1980 to nearly 70 percent in 1994. Also, the percentage of CEOs holding stock options increased from 57 percent to 87 percent for the same period. Hall and Murphy (2003) find the average real pay for S&P 500 CEOs skyrocketed during the 1990s, growing from \$3.5 million in 1992 to \$14.7 million in

2000. According to these authors, most of this increase reflects the escalation in stock option values at time of grant, which grew nine-fold from an average of about \$800,000 in 1992 to nearly \$7.2 million in 2000.

Looking at Figure 4, the mean equity-based compensation component (restricted stock plus value of stock options) of CEO compensation increased almost seven-fold from 1993 through 2000. This is an annualized nominal growth rate of 31.1% per year compared to an annualized nominal growth rate of 16.0% per year for the S&P 500 index (before dividends). The substantially higher growth rate in CEO equity-based compensation relative to the S&P 500 index growth rate seems 'excessive' and probably unnecessary for addressing any potential agency conflict. For the period of 1993 through 2005 the CEO equity-based compensation increased at an annualized nominal growth rate of 12.3% per year compared to an annualized nominal growth rate of 8.5% per year for the S&P 500 index (before dividends). While not apparently as excessive it still may have been more than was necessary to address any potential agency conflict. These comparisons suggest that equity-based compensation is a likely contributor to any disconnection between CEO total direct compensation and firm performance.

Arguably, a substantial fraction of stock price increases is due to market and industry movements, rather than to firm-specific factors that might reflect the CEO's own performance. Therefore, CEOs can profit substantially from their stock options even when their companies' performance lags that of their peers, as long as market and industry movements provide sufficient boost for the firm's stock price. Also, stock options enable CEOs to legally profit from temporary spikes in the firm's stock price, even when long-term stock performance is poor (however, it is illegal for CEOs to take

advantage of inside information that is not available to the public when exercising their options). As designed, a CEO's profit from stock options is not necessarily linked to firm performance. The question is whether or not firm performance, measured either by accounting metrics or changes in the stock price, justifies this increase in CEO equity-based compensation. Alternatively, since causal direction is unknown, would market returns have been as high if CEOs had not been as well compensated?

Lastly, I explore the Other compensation component of CEO compensation. Looking at Figure 4, the mean Other compensation component of CEO compensation increased almost three-fold from 1993 through 2005. This is an annualized nominal growth rate of 11.7% per year compared to an annualized nominal growth rate of 8.5% per year for the S&P 500 index (before dividends). This comparison suggests that Other compensation may be excessive relative to market (firm) performance and that it is a likely contributor to any disconnection between CEO total direct compensation and firm performance.

For the reasons noted above, much of the attention in the media and in academic research has been on the tremendous increase in the contribution of equity-based compensation to executives' compensation during the 1990s. However, non-equity based compensation continues to be substantial and should not be overlooked. According to Bebchuk and Grinstein (2005), non-equity compensation represented on average about half of the total compensation of both the CEO and the top five executives of S&P 1500 companies not classified as new economy firms in 2003. Murphy (1999) points out that many firms use subjective criteria for at least some of their cash (non-equity) bonus payments. Such subjectivity can be a useful tool in the hands of boards that are looking

out for stockholder interests. However, boards that favor their top executives over stockholders can use their discretion to pay executives handsome bonuses for substandard performance or any other reason. For example, Grinstein and Hribar (2004) find in about 40% of large acquisitions during the period from 1993 to 1999, the acquiring firm's CEO received a multi-million dollar cash bonus for closing the transaction. The authors argue that an acquisition is not an action for which CEOs should receive additional compensation above and beyond whatever rewards they stand to receive from the resulting effect of the acquisition on the value of the CEO's options, shares, firm size based incentives, and prestige. Even when firms use objective criteria, cash bonuses are typically based on the firm's own operating or accounting performance, which ignores and may be substandard to peers' performance.

Another area that demonstrates the disconnection between CEO compensation and firm performance is the severance payments provided to departing CEOs. CEOs pushed out by their boards can be paid a handsome severance amounting to two or three years' worth of annual compensation, regardless of the firm's performance. These payments are often not reduced even when the CEO's performance has been clearly substandard. For example, Carly Fiorina, former CEO of Hewlett Packard, was awarded a \$21 million severance package when she was dismissed of her duties even though the board and the stockholders were disappointed with the performance of Hewlett Packard and its acquisition of Compaq. Another example is Robert Nardelli, former CEO of Home Depot, who was paid \$210 million when he resigned under pressure even though Home Depot had underperformed the market and its primary competitor Lowe's throughout his reign.

Research by Bebchuk and Fried (2005) finds that pension payments can demonstrate a disconnection of pay from performance. The authors perform a case study on Franklin Raines, who was forced to retire as Fannie Mae's CEO in late 2004. Terms of the pension obligated Fannie Mae to pay him (or his surviving spouse after his death) an annual pension of approximately \$1.4 million, an amount specified without any connection to the firm's stock performance under Raines. Bebchuk and Fried (2005) estimate the value of this non-performance element of his pension at about \$25 million.

In summary, there is substantial evidence to suggest that CEO compensation (particularly the equity-based and Other components of compensation) may not be sufficiently linked to firm performance, an issue I will discuss in more detail later when I develop my specific research hypotheses.

A related question is whether or not a disconnection between CEO compensation and firm performance exists for all CEOs or for just a sub-set of CEOs. For example, it could be that a relatively small number of highly-paid CEOs have an inordinate impact on the mean values of the components of compensation that are shown in Figures 3 and 4. To explore this question, Figure 5 presents mean CEO total direct compensation each year for three groups of CEOs based simply on a ranking of total direct compensation each year: all CEOs, those CEOs in the top 10% of total direct compensation, and those in the bottom 90% of total direct compensation. (Note that in the next sub-section I develop a more rigorous method for ranking and classifying the CEOs; I rank by total direct compensation in this section just to illustrate that a relatively small number of the highly paid CEOs skew the sample.)

Figure 5 shows that the baseline group of all CEOs has a ‘hump’ in the total direct compensation from about 1998 through 2002. For the group of all CEOs, the total direct compensation increased by a nominal rate of 20.9% per year from 1993 through 2000 then declined thereafter by a nominal rate of 3.6% per year through 2005. In contrast, the bottom 90% group of CEOs by total direct compensation had an annualized nominal growth rate of 14.5% (substantially less than the group of all CEOs) from 1993 through 2000 and it continued to increase by a nominal rate 3.4% per year through 2005. Even though the bottom 90% group of CEOs has a hump for the year 2000 in the plot, it is not nearly as pronounced a hump as for the group of all CEOs.

In contrast, as shown in Figure 5, the plot for the CEOs in the top 10% by total direct compensation has a huge hump in the 1997-2002 period. The top 10% group of CEOs by total direct compensation had an annualized nominal growth rate in total direct compensation of 27.9% from 1993 through 2000 then declined thereafter at the nominal rate of 10.2% per year through 2005. In comparison, the S&P 500 index increased 16.0% per year from 1993 through 2000 then declined modestly thereafter at the rate of 1.1% per year through 2005. These comparisons certainly suggest that a sub-set of CEOs may be the primary culprit for any disconnection between CEO compensation and firm performance.

In summary, I make three observations based on the information presented in Table 1 and Figures 1-5. First, the level and composition of the components of CEO compensation change substantially during the sample period; the level of compensation increases significantly during the period and equity-based compensation becomes the largest component of compensation. Second, the data do not reveal any obvious link

between CEO compensation and firm performance; in fact, mean compensation has grown more rapidly than shareholder wealth. Third, a relatively small number of highly paid CEOs appear to be skewing the mean compensation upward.

These observations motivate the idea that it is possible that previous empirical research results and conclusions regarding the link between CEO compensation and firm performance might be distorted because previous studies have failed to explicitly address the impact caused by a small number of highly paid and influential CEOs. In the next sub-section, I build on this thought and develop my specific research questions.

3.3 Motivation of Research Questions

Sub-section 3.3.1 is a review of the specific literature that motivates my empirical research. Sub-section 3.3.2 describes the proxy for CEO managerial power that I use in my empirical tests to rank and classify CEOs. Sub-section 3.3.3 presents the specific research questions.

3.3.1 Literature Review

A particular body of research examines the issue of linking executive pay to firm performance by focusing on the observation that CEO compensation varies widely across firms, even within the same industry. This research uses CEO characteristics, (such as “superstar” or “celebrity” status, “reputation”, “skill”, “managerial power”, age, dual role as CEO and Chairman of the Board, and percent of firm ownership by the CEO) and firm characteristics (such as size, complexity, growth opportunities, and leverage) to explain ‘why’ CEOs’ compensation varies widely in cross-section. However, this research

assumes that the same compensation model (i.e., structure of the model, explanatory variables, and coefficients on those variables) can be applied to all CEOs (this assumption is implicit in the use of all CEO's in the samples for which the models are estimated). In other words, extant research assumes a one-size-fits-all CEO compensation model. Furthermore, much of this research also examines firm performance and similarly utilizes a one-size-fits-all firm performance model. I review some of that literature next and for convenient referral I summarize the models and the findings of the literature I consider key to my research in Table 2.

A possible explanation for extraordinarily high CEO compensation is the belief that a “superstar” CEO could deliver outsized performance. If the board has the mindset that a particular CEO candidate can lead a firm to superior success then higher compensation levels for those individuals is appropriate and should be acceptable to the stockholders. Sherwin Rosen is often given credit for coining the term “superstar” as used in the context of researching CEO or executive compensation. The following quote from Rosen (1981) provides a clear description of the term: “The phenomenon of Superstars, wherein relatively small numbers of people earn enormous amounts of money and dominate the activities in which they engage, seems to be increasingly important in the modern world.” Ironically, that was published in 1981 yet it is still “increasingly” important in the modern world in 2008.

Malmendier and Tate (2005) build on Rosen's concept and define “superstar” CEOs as those who receive prestigious awards from the business press. The authors find that the firms of such CEOs subsequently under perform after the CEO receives the award, compared to both the overall market and a sample of hypothetical award winners

(CEOs that did not win awards but have matching firm and CEO characteristics to actual award winners). They also find that CEOs who win awards are compensated more after receiving the awards, in absolute dollars and relative to the number 2 executive in the firm. Furthermore, CEOs spend more time on external activities (including outside directorships and writing books) after receiving the awards. These effects are strongest in poorly governed firms implying a correlation between the personal benefits of a CEO's superstar status and the weakness of a firm's corporate governance.

Hayward, Rindova and Pollock (2004) develop a theoretical model in which CEO "celebrity" status is in part a product of the tendency of journalists to over-attribute a firm's actions and results, good or bad, to the ability of the CEO rather than to broader contributing factors. The authors argue that CEOs can internalize this over-attribution, become overconfident, and make decisions unfavorable to the firm. Wade, Porac, Pollock and Graffin (2006) discuss the burden of celebrity and argue that the Financial World's CEO of the Year Award is a "certification" contest that effectively ranks the CEOs for the benefit of the firms' stakeholders. They find a positive correlation between CEO total compensation and certification when return on equity is relatively high and find a negative correlation between CEO total compensation and certification when return on equity is relatively low, which implies certified CEOs are rewarded when return on equity is high and punished when return on equity is low. They find an undesirable, from the stockholders perspective, negative correlation between CEO awards and current year stock performance.

Wade, Porac, Pollock and Graffin (2006) define “certification” in a similar manner to how Malmendier and Tate (2005) define “superstar” and both papers find a negative correlation between CEO awards and firm performance.

Milbourn (2003) develops the idea that a CEO’s “reputation” or perceived ability should affect the CEO’s compensation package, particularly the pay-for-performance components. Milbourn also hypothesizes that reputation should help explain the enormous variation in CEO pay-for-performance sensitivities across firms. As proxies for reputation, Milbourn uses: (1) CEO tenure, (2) the number of business articles in which the CEO’s name appears, (3) whether or not the CEO was hired from outside of the firm, and (4) industry adjusted firm performance. Milbourn finds a statistically and economically significant positive relationship between pay-for-performance sensitivity and reputation.

Daines, Nair and Kornhauser (2005) argue that CEO “skill” helps explain the variation in CEO compensation across firms. Their definition of a highly skilled CEO is one who leads a firm to continued good performance (they use return on assets and abnormal stock returns) from one year to the next, relative to industry peers. They also define a highly skilled CEO as one who turns around prior poor firm performance from one year to the next, relative to industry peers. They find that highly compensated CEOs appear more skilled than their industry peers when firms are small (particularly when there is a large stockholder to monitor activities) and that the CEO has high incentive compensation (alignment with the shareholder). Also, highly compensated CEOs appear more skilled than their industry peers when the firm faces fewer environmental constraints on management discretion (that is, more skill is required with more

discretionary decisions). By contrast, compensation is negatively related to skill in firms constrained by environmental conditions (less skill is required with fewer discretionary managerial decisions); especially when there is no large stockholder to monitor management or the firm is large.

Holmstrom and Kaplan (2003) shed a different light on this issue by suggesting that only a few CEOs have sufficient power or influence to extract excessive compensation. They note that in 2001 the top ten CEOs of U.S. firms received average option grants of \$170 million, while the median value of total compensation for CEOs of the S&P 500 companies was only about \$7 million. The authors argue that “U.S. executive pay may not be quite the runaway train that has been portrayed in the press.” However, I find no research that thoroughly investigates the impact and distortions that a class of ‘only a few’ powerful CEOs (i.e., those with sufficient levels of managerial power or influence to extract excessive compensation) has on the one-size-fits-all CEO compensation and firm performance models. In addition, the literature has not examined whether the firms that are led by such CEOs experience superior performance. This void in the literature motivates my research.

3.3.2 A Proxy for Managerial Power

A key aspect of this research is how best to measure a CEO's managerial power to extract higher and different compensation, after controlling for other variables, and to determine whether CEOs with managerial power receive higher compensation because they are superior CEOs based on firm performance measures or because they have undue influence over their own compensation. The classifications of CEOs used in prior

research, such as “superstar”, “celebrity”, “certification”, “reputation”, and “skill”, each measure to some extent CEO managerial power. However, I propose an alternative measure of CEO managerial power. I define the CEO/Number_2 Ratio as the ratio of CEO total direct compensation to the total direct compensation of the highest paid non-CEO executive in the firm. I believe this ratio is a meaningful proxy for CEO managerial power, as described below.

First, the CEO/Number_2 Ratio directly measures the CEOs influence or authority over the firm’s board, which is responsible for setting the CEO’s compensation, to extract excess compensation relative to another executive in the same firm. This implies the CEOs with the highest CEO/Number_2 Ratios have the most managerial power. An appealing attribute of this proxy for CEO managerial power is that it is based on data internal to the firm (no external measures such as press certifications, media or industry awards, or market opinion are required) and therefore more directly measures a CEOs influence within the firm.

Second, this CEO/Number_2 Ratio has precedent in prior research. Hayward and Hambrick (1997) examine the role of CEO hubris in explaining large acquisition premiums. They argue that “the greater the CEO’s relative compensation to the number two executive, the greater the CEO’s self-importance and the more likely the CEO is to be infected with hubris.” The authors find a positive correlation between this CEO/Number_2 Ratio and acquisition premiums, which implies higher CEO managerial power. Malmendier and Tate (2005) find that for CEOs receiving awards (i.e., “superstar CEOs”), the CEO/Number_2 Ratio is greater after receiving the reward relative to prior

to receiving the award. This result implies an increase in CEO managerial power after receiving an award.

Third, many of the same variables that are included to explain CEO compensation should also be included in a model to explain the compensation of a company's other highly paid executives. This implies that the CEO/Number_2 Ratio should be relatively constant across firms and that any significant deviation in this ratio is due to excessive managerial power wielded by the CEO.

For these reasons, I use the CEO/Number_2 Ratio as a metric for ranking and classifying the CEOs for the purposes described in the next sub-section.

3.3.3 Research Questions

My dissertation examines four research questions. The first two questions focus on (1) the impact that the inclusion of Elite CEOs in a sample has on standard compensation models and (2) the factors that affect Elite CEO compensation differently from Non-Elite CEO compensation.

Question (1): Is the CEO compensation model that explains Elite CEO compensation different from the one-size-fits-all CEO compensation model? Asked another way, does the one-size-fits-all CEO compensation model apply for Elite CEOs? The methodology for answering this question is more fully developed in Section 4.

Question (2): If the compensation of different classes of CEOs (Elite CEOs and Non-Elite CEOs) are best described with different CEO compensation models, which is what I expect, then how are they compensated differently? That is, should the CEO compensation model for each class of CEO (Elite CEOs and Non-Elite CEOs) contain the

same structure and the same variables? Or if the same variables are contained in the models, are there different coefficients on these variables? For example, is the equity-based compensation for Elite CEOs more sensitive to past firm performance than Non-Elite CEOs? The methodology for answering this question is more fully developed in Section 4.

The empirical research for *Questions 1* and *2* specifically investigates whether Elite CEOs are compensated differently from Non-Elite CEOs. If the same one-size-fits-all model does not apply to all CEOs, then existing models distort the significance of the variables that are in the CEO compensation regression with respect to the impact they have on Elite CEOs. This of course suggests that we do not fully understand compensation of Elite CEOs and have possibly been underestimating the role of CEO managerial power in determining CEO compensation.

Furthermore, I hypothesize that Elite CEOs' firms do not experience superior performance compared to Non-Elite CEOs' firms. For this hypothesis I perform empirical tests to answer the following *Questions 3* and *4*.

Question (3): Is the firm performance model that explains Elite CEOs' firms' performance different from the one-size-fits-all firm performance model? Asked another way, does the one-size-fits-all firm performance model apply for Elite CEOs' firms? The methodology for this question is more fully developed in Section 4.

Question (4): If the firm performance of the different classes of CEOs' (Elite CEOs and Non-Elite CEOs) firms are best described with different firm performance models, which is what I expect, then how do the firms perform differently? That is, should the firm performance model for each class of CEO (Elite CEOs and Non-Elite

CEOs) contain the same structure and the same variables? Or if the same variables are contained in the different models, are there different coefficients on these variables? For example, is the firm performance for Elite CEOs' firms more sensitive to firm sales than Non-Elite CEOs? The methodology for this question is more fully developed in Section 4.

The empirical research for *Questions 3 and 4* specifically investigates whether or not Elite CEOs' firms perform differently than Non-Elite CEOs' firms. If the same one-size-fits-all firm performance model does not apply to all CEOs' firms, then existing models distort the significance of the variables that are in the firm performance regression with respect to the impact they have on the Elite CEOs' firms. This of course suggests that we do not fully understand the firm performance of Elite CEOs' firms and have possibly been underestimating the role of CEO managerial power in determining firm performance.

There are two important potential implications of the findings of this research. First, it is possible that previous empirical research results and conclusions regarding the link between CEO compensation and firm performance might be distorted because previous studies have failed to explicitly address the impact caused by a small number of highly paid and influential CEOs. Second, it is important for shareholders, boards, and policy makers to understand the link (if one exists) between CEO managerial power and firm performance.

4 Methodology

In this section I describe the steps involved in performing my research. I describe the data in Section 5 and present the results in Section 6.

4.1 Step 1: Develop the Classification of Elite CEO

I rank the CEOs using the proxy for CEO managerial power, CEO/Number_2 Ratio. I then segregate the CEOs into two groups or classes: “Elite CEOs” (above some cut-off by ranking) and “Non-Elite CEOs” (the remaining CEOs). I use these classifications for CEO compensation regressions and firm performance regressions. I describe in detail my method for determining the cut-off level for classifying the CEOs (including an alternate proxy for CEO managerial power for robustness tests and alternative cut-off levels for sensitivity tests) in Section 6.

4.2 Step 2: Are Elite CEOs Compensated Differently?

Question (1): Is the CEO compensation model that explains Elite CEO compensation different from the one-size-fits-all CEO compensation model? Asked another way, does the one-size-fits-all CEO compensation model apply for Elite CEOs? I initiate this analysis by including an Elite CEO dummy variable and its interaction with all of the explanatory variables (except for the year and industry dummies) in the CEO compensation regressions. I then perform a modified Chow Test to determine if the Elite CEO interaction terms are jointly equal to zero. It is a modified Chow Test in the sense that I do not interact the Elite CEO dummy with the year and industry dummy variables.

This research specifically investigates whether or not the class of Elite CEOs is compensated differently from Non-Elite CEOs. If the same one-size-fits-all model does not apply to all CEOs, then existing models might distort the significance of the variables that are in the CEO compensation regression with respect to the impact they have on Elite CEOs. This of course suggests that we do not fully understand the compensation of Elite CEOs and have possibly been underestimating the role of CEO managerial power in determining CEO compensation.

I use five measures of CEO compensation (salary, bonus, equity-based compensation, Other compensation, and total direct compensation) as the dependent variable in my base case regressions. I also run a sensitivity case with only the firms that are in the sample for the full thirteen years with CEO total direct compensation as the dependent variable (to explore potential survivorship issues). I then run three sensitivities using different methods for ranking and classifying the CEOs on each of the six cases. Furthermore, for each of the cases I run both random-effects and fixed-effects on the firm-effects (in Section 6, I show why firm-effects is a better specification than CEO-effects), and then perform the Hausman test to determine which is appropriate.

I use the following empirical specification of CEO compensation, which is similar to models used in the literature:

$$\begin{aligned}
\ln(\text{compensation}_{i,j,t}) = & \beta_0 + \beta_1(\text{ROA}_{i,j,t-1}) + \beta_2(\text{Net Income 3-year growth rate}_{i,j,t-1}) \\
& + \beta_3(\text{Shareholder 3-year return}_{i,j,t-1}) \\
& + \beta_4 \ln(\text{Sales}_{i,j,t-1}) + \beta_5(\text{Stock volatility}_{i,j,t-1}) \\
& + \beta_6(\text{Total Liabilities}_{i,j,t-1} / \text{assets}_{i,j,t-1}) + \beta_7(\text{PP \& E}_{i,j,t-1} / \text{assets}_{i,j,t-1}) \\
& + \beta_8(\text{R \& D}_{i,j,t-1} / \text{assets}_{i,j,t-1}) + \beta_9(\text{Market to Book ratio}_{i,j,t-1}) \\
& + \beta_{10}(\text{CEO age}_{i,j,t-1}) + \beta_{11}(\text{CEO age}^2_{i,j,t-1}) + \beta_{12}(\text{CEO tenure}_{i,j,t-1}) \\
& + \beta_{13}(\text{Governance Index}_{i,j,t-1}) \\
& + \beta_{14}(\text{Elite CEO dummy}) + \beta_x(\text{Elite CEO Interaction Terms}) \\
& + \text{Industry dummies} + \text{Year dummies} + \varepsilon_{i,j,t}
\end{aligned} \tag{1}$$

where subscripts i , j , and t denote firm, CEO and time, respectively.² I include three measures of firm performance as explanatory variables in the CEO compensation regressions: (1) the net income before extraordinary items over assets (return on assets or ROA), in the year prior to the year of observation, as a proxy for CEO skill and to help explain CEOs' annual bonus, (2) 3-year growth rate in net income in the year prior to the year of observation, as a proxy for CEO skill and to help explain CEOs' long term incentive plan bonus, and (3) 3-year shareholder return with dividends reinvested, in the year prior to the year of observation, as a proxy for CEO skill and to help explain CEOs' equity-based compensation. Generally, I expect a positive correlation between all components of CEO compensation and past firm performance. I include predicted positive signs in the results tables.

I include six measures of firm characteristics as explanatory variables in the CEO compensation regressions: (1) the natural log of sales, in the year prior to the observation, explains firm scale and complexity, (2) the Black-Scholes stock volatility measure, in the

² β represents the partial coefficient on the explanatory variable, β_x represents the set of partial coefficients on the explanatory variables interacted with Elite CEO dummy, and ε represents the error term. *Industrydummies* represents the set of industry dummies and their respective partial coefficients. *Yeardummies* represents the set of year dummies and their respective partial coefficients.

year prior to the observation, explains firm complexity, (3) the ratio of total liabilities to total assets, in the year prior to the observation, explains firm complexity, (4) the ratio of a firm's net property, plant, and equipment (PP&E) to total assets, in the year prior to the observation, explains firm complexity, (5) the ratio of the firm's research and development expenditures (R&D) to total assets, in the year prior to the observation, explains firm complexity, and (6) the ratio of market value of assets to the book value of assets, in the year prior to the observation, explains firm growth opportunity and complexity. Generally, I expect a positive correlation between all components of CEO compensation and firm characteristics based on the notion that a CEO that manages a larger or more complex firm deserves higher compensation. I include predicted positive signs in the results tables.

I include three CEO characteristic as an explanatory variable in the CEO compensation regressions: (1) the age of the CEO in the year prior to the observation, proxy for CEO experience and presumably skill, (2) the age of the CEO squared in the year prior to the observation, proxy for CEO experience and presumably skill, and (3) CEO tenure at the firm in the year prior to the observation, proxy for CEO experience and standing at the firm. The previous research has found mixed signs and significance for the coefficient on this variable. Based on the idea that an older CEO or a CEO with more tenure is more highly skilled and experienced and therefore deserving of higher compensation, I include positive predicted signs in the results tables.

I include the Gompers, Ishii and Metrick governance index to control for firm governance characteristics. Gompers, Ishii and Metrick (2003) develop the governance index as a proxy for shareholder rights based on 24 governance rules. The construction

of the governance index for each firm is as follows: the authors add 1 point for every provision that restricts shareholder rights (increases managerial power). The governance index ranges from 1 (strongest shareholder rights) to 24 (weakest shareholder rights). Generally, I expect a positive correlation between all components of CEO compensation and weakness in the governance index, i.e. the weaker corporate governance leads to higher CEO compensation. I include predicted positive signs in the results tables as compensation is increasing with increasing weakness in corporate governance. I also include industry and year dummy variables in the CEO compensation regressions.

Table 3 presents a list and a description of the variables and the sources of the data for the CEO compensation regressions. Table 4 presents summary results from previous research models, including the signs and significance of estimated coefficients on the control variables for a variety of different dependent variables that measure compensation.

I perform a modified Chow Test to determine if the Elite CEOs are compensated differently. To perform the modified Chow Test I include an Elite CEO dummy variable (equal to 1 for Elite CEOs and 0 otherwise) and interact it with all explanatory variables (except for the year and industry dummies) then test the null that the coefficients on the Elite CEO dummy and all Elite CEO interaction terms are jointly equal to zero. If the null is rejected, then Elite CEOs are compensated differently and something else is going on that is not captured in the CEO compensation models, such as excessive CEO managerial power or weak corporate governance.

4.3 Step 3: How Are Elite CEOs Compensated Differently?

Question (2): If the compensation of different classes of CEOs (Elite CEOs and Non-Elite CEOs) are best described with different CEO compensation models, which is what I expect, then how are they compensated differently? That is, should the CEO compensation model for each class of CEO (Elite CEOs and Non-Elite CEOs) contain the same structure and the same variables? The research in this step assumes the same variables are contained in the both the Elite CEO and Non-Elite CEOs compensation models and investigates whether the coefficients on these variables are different. For example, is total direct compensation for Elite CEOs more sensitive to past firm performance than Non-Elite CEOs?

This step involves three additional cases (“All CEOs”, “Non-Elite CEOs” (the CEOs that are not Elite), and Elite CEOs) for each of the five measures of CEO compensation as the dependent variable. Furthermore, for each case I run both random-effects and fixed-effects on the firm-effects (I describe my support for using firm-effects instead of CEO-effects in Section 6), and then perform the Hausman test to determine which is appropriate.

I use the following empirical specification of CEO compensation:

$$\begin{aligned}
\ln(\text{compensation}_{i,j,t}) = & \beta_0 + \beta_1(\text{ROA}_{i,j,t-1}) + \beta_2(\text{Net Income 3-year growth rate}_{i,j,t-1}) \\
& + \beta_3(\text{Shareholder 3-year return}_{i,j,t-1}) \\
& + \beta_4(\ln(\text{Sales}_{i,j,t-1})) + \beta_5(\text{Stock volatility}_{i,j,t-1}) \\
& + \beta_6(\text{Total Liabilities}_{i,j,t-1} / \text{assets}_{i,j,t-1}) + \beta_7(\text{PP \& E}_{i,j,t-1} / \text{assets}_{i,j,t-1}) \quad (2) \\
& + \beta_8(\text{R \& D}_{i,j,t-1} / \text{assets}_{i,j,t-1}) + \beta_9(\text{Market to Book ratio}_{i,j,t-1}) \\
& + \beta_{10}(\text{CEO age}_{i,j,t-1}) + \beta_{11}(\text{CEO age}^2_{i,j,t-1}) + \beta_{12}(\text{CEO tenure}_{i,j,t-1}) \\
& + \beta_{13}(\text{Governance Index}_{i,j,t-1}) \\
& + \text{Industry dummies} + \text{Year dummies} + \varepsilon_{i,j,t}
\end{aligned}$$

where subscripts i , j , and t denote firm, CEO and time, respectively.³ For this set of CEO compensation regressions I use the same explanatory variables and expect the same signs on the coefficients as described in Step 2. However, for this set of CEO compensation regressions I do not include the Elite CEO dummy or the Elite CEO interaction terms.

The analysis of these regressions is a simple comparison of the statistical and economic significance of the coefficients on the variables from the three additional cases just described (All CEOs, Non-Elite CEOs, and Elite CEOs) and the case from Step 2. If the coefficients and their statistical significances are different, then something else is going on that is not captured in the CEO compensation models, such as excessive CEO managerial power or weak corporate governance.

4.4 Step 4: Do Elite CEOs' Firms Perform Differently?

Question (3): Is the firm performance model that explains Elite CEOs' firms' performance different from the one-size-fits-all firm performance model? Asked another way, does the one-size-fits-all firm performance model apply for Elite CEOs' firms? I

³ β represents the partial coefficient on the explanatory variable and ε represents the error term. *Industrydummies* represents the set of industry dummies and their respective partial coefficients. *Yeardummies* represents the set of year dummies and their respective partial coefficients.

initiate this analysis by including an Elite CEO dummy variable and its interaction with all of the explanatory variables (except for the year and industry dummies) in the firm performance regressions. I then perform a modified Chow Test to determine if the Elite CEO interaction terms are jointly equal to zero.

This research specifically investigates whether or not Elite CEOs' firms perform differently from Non-Elite CEOs' firms. If the same one-size-fits-all firm performance model does not apply to all CEOs' firms, then existing models distort the significance of the variables that are in the firm performance regression with respect to the impact they have on the Elite CEOs' firms. This of course suggests that we do not fully understand the performance of Elite CEOs' firms and have possibly been underestimating the role of CEO managerial power in determining firm performance.

For this step, I use eight measures of firm performance (forward one-year return on assets, forward one-year return on equity, forward three-year growth rate in net income, forward five-year growth rate in net income, forward shareholder one-year return including reinvesting dividends, forward shareholder three-year return including reinvesting dividends, forward shareholder five-year return including reinvesting dividends, and market value to book value ratio) as dependent variables. I also run a sensitivity case using only the firms that are in the sample for the full thirteen years for each of the eight dependent variables (to explore potential survivorship issues). I then run one sensitivity test on each of the cases using a different method for ranking and classifying the CEOs. Furthermore, for each case I run both random-effects and fixed-effects on the firm-effects (I support using firm-effects instead of CEO-effects in Section 6), and then perform the Hausman test to determine which is appropriate.

I use the following empirical specification of firm performance for seven of the eight dependent variables (all but the market value to book value ratio which has a different specification as described later):

$$\begin{aligned}
(\text{firm performance}_{i,j,t+\text{varies}}) = & \beta_0 + \beta_1 \ln(\text{Firm size}_{i,j,t}) + \beta_2 (\text{Stock volatility}_{i,j,t}) \\
& + \beta_3 (\text{Total liabilities}_{i,j,t} / \text{assets}_{i,j,t}) + \beta_4 (\text{PP \& E}_{i,j,t} / \text{assets}_{i,j,t}) \\
& + \beta_5 (\text{R \& D}_{i,j,t} / \text{assets}_{i,j,t}) + \beta_6 (\text{Market to Book ratio}_{i,j,t}) \\
& + \beta_7 \ln(\text{Salary}_{i,j,t}) + \beta_8 \ln(\text{Bonus}_{i,j,t}) \\
& + \beta_9 \ln(\text{Equity-based}_{i,j,t}) + \beta_{10} \ln(\text{Other}_{i,j,t}) \tag{3} \\
& + \beta_{11} (\text{CEO age}_{i,j,t}) + \beta_{12} (\text{CEO age}^2_{i,j,t}) + \beta_{13} (\text{CEO tenure}_{i,j,t}) \\
& + \beta_{14} (\text{Governance Index}_{i,j,t}) \\
& + \beta_{15} (\text{Elite CEO dummy}) + \beta_x (\text{Elite CEO Interaction Terms}) \\
& + \text{Industry dummies} + \text{Year dummies} + \varepsilon_{i,j,t}
\end{aligned}$$

where for equation 3 subscripts i , j and t denote the firm, CEO and time, respectively.⁴ I include six measures of firm characteristics as explanatory variables in the firm performance regressions: (1) the natural log of sales, in the year of the observation, explains firm scale and complexity, (2) the Black-Scholes stock volatility measure, in the year of the observation, explains firm complexity, (3) the ratio of total liabilities to total assets, in the year of the observation, explains firm complexity, (4) the ratio of a firm's net property, plant, and equipment (PP&E) to total assets, in the year of the observation, explains firm complexity, (5) the ratio of the firm's research and development expenditures (R&D) to total assets, in the year of the observation, explains firm

⁴ β represents the partial coefficient on the explanatory variable, β_x represents the set of partial coefficients on the explanatory variables interacted with Elite CEO dummy, and ε represents the error term. *Industry dummies* represents the set of industry dummies and their respective partial coefficients. *Year dummies* represents the set of year dummies and their respective partial coefficients.

complexity, and (6) the ratio of market value to book value, in the year of the observation, explains firm growth potential.

Based on the efficient market theory that all information is already priced in the market, I do not expect a statistically significant or consistent correlation between market-based measures of forward firm performance and firm characteristics. Likewise and somewhat by extension, I do not expect a statistically significant or consistent correlation between accounting based measures of forward firm performance and firm characteristics. However, consistent with the literature these firm characteristics will be included as control variables. I include not significant (“NS”) for the predicted signs in my results tables.

I include four measures of CEO compensation as explanatory variables in the firm performance regressions: (1) CEO annual salary in the year of the observation, proxy for CEO experience and presumably skill, (2) CEO annual bonus in the year of the observation, proxy for CEO experience and presumably skill, (3) CEO equity-based compensation in the year of the observation, proxy for CEO experience and presumably skill, and (4) CEO Other compensation in the year of the observation, proxy for CEO experience and presumably skill. Based on the efficient market theory that all information is already priced in the market, I do not expect a statistically significant or consistent correlation between market-based measures of firm performance and measures of CEO compensation. However, Mehran (1995) found a statistically significant positive relationship between CEO equity-based compensation and both Tobin’s Q and return on assets. Therefore I expect a positive correlation between accounting based measures of firm performance and all measures of CEO compensation. I include NS for the predicted

signs for the market-based measures of firm performance in my results tables and include a positive predicted sign for the accounting based measures of firm performance in my results tables.

I include three CEO characteristic as an explanatory variable in the CEO compensation regressions: (1) the age of the CEO in the year of the observation, proxy for CEO experience and presumably skill, (2) the age of the CEO squared in the year of the observation, proxy for CEO experience and presumably skill, and (3) CEO tenure at the firm in the year of the observation, proxy for CEO experience and standing at the firm. Based on the premise that an older CEO or a CEO with more tenure is more highly skilled and experienced and based on Daines, Nair and Kornhauser (2005)'s finding of a positive correlation between CEO skill and forward firm performance I include positive predicted signs in my results tables.

I include the Gompers, Ishii and Metrick governance index to control for firm governance characteristics. Generally, shareholders want a positive correlation between firm performance and a strengthening governance index, i.e. stronger corporate governance should lead to better firm performance. Unfortunately, the previous research has found mixed signs and significance for the coefficients on various measures of corporate governance. The construction of the governance index is described in subsection 4.2 but to review it ranges from 1 (strongest shareholder rights) to 24 (weakest shareholder rights). I include negative predicted signs in my results tables as firm performance is decreasing with increasing weakness in the governance index. I also include industry and year dummy variables in the firm performance regressions.

The market to book ratio is different from the other performance metrics in that it does not measure a rate of return. The market value of a firm can be thought of as the capitalized value of different firm characteristics. Therefore, I use the following empirical specification for the market value to book value ratio:

$$\begin{aligned}
(\text{MarkettoBookRatio}_{i,j,t}) = & \beta_0 + \beta_1(\text{NetIncome}_{i,j,t} / \text{assets}_{i,j,t}) + \\
& + \beta_2(\text{Total liabilities}_{i,j,t} / \text{assets}_{i,j,t}) + \beta_3(\text{PP \& E}_{i,j,t} / \text{assets}_{i,j,t}) \\
& + \beta_4(\text{R \& D}_{i,j,t} / \text{assets}_{i,j,t}) + \\
& + \beta_5(\text{CEO age}_{i,j,t}) + \beta_6(\text{CEO age}^2_{i,j,t}) + \beta_7(\text{CEO tenure}_{i,j,t}) \quad (4) \\
& + \beta_8(\text{Governance Index}_{i,j,t}) \\
& + \beta_9(\text{Elite CEO dummy}) + \beta_x(\text{Elite CEO Interaction Terms}) \\
& + \text{Industry dummies} + \text{Year dummies} + \varepsilon_{i,j,t}
\end{aligned}$$

where for equation 4 subscripts i , j and t denote the firm, CEO and time, respectively.⁵ I include four measures of firm characteristics as explanatory variables: (1) the ratio of net income to the assets, in the year of the observation, explains firm profitability, (2) the ratio of total liabilities to total assets, in the year of the observation, measures the leveraging effects of debt, (3) the ratio of a firm's net property, plant, and equipment (PP&E) to total assets, in the year of the observation, measures tangibility of assets, and (4) the ratio of the firm's research and development expenditures (R&D) to total assets, in the year of the observation, is a proxy for growth.

⁵ β represents the partial coefficient on the explanatory variable, β_x represents the set of partial coefficients on the explanatory variables interacted with Elite CEO dummy, and ε represents the error term. *Industrydummies* represents the set of industry dummies and their respective partial coefficients. *Yeardummies* represents the set of year dummies and their respective partial coefficients.

I include three CEO characteristics as an explanatory variable in the CEO compensation regressions: (1) the age of the CEO in the year of the observation, proxy for CEO experience and presumably skill, (2) the age of the CEO squared in the year of the observation, proxy for CEO experience and presumably skill, and (3) CEO tenure at the firm in the year of the observation, proxy for CEO experience and standing at the firm. Based on the premise that an older CEO or a CEO with more tenure is more highly skilled and experienced and based on Daines, Nair and Kornhauser (2005)'s finding of a positive correlation between CEO skill and forward firm performance I include positive predicted signs in my results tables.

I include the Gompers, Ishii and Metrick governance index to control for firm governance characteristics. Generally, shareholders want a positive correlation between firm performance and a strengthening governance index, i.e. stronger corporate governance should lead to better firm performance. Unfortunately, the previous research has found mixed signs and significance for the coefficients on various measures of corporate governance. The construction of the governance index is described in subsection 4.2 but to review it ranges from 1 (strongest shareholder rights) to 24 (weakest shareholder rights). I include negative predicted signs in my results tables as firm performance is decreasing with increasing weakness in the governance index. I also include industry and year dummy variables in the firm performance regressions.

As mentioned previously, a list and a description of the variables and the sources of the data are provided in Table 5. I list the variables and present the sign and significance of the results of prior research that performed regressions with some measure of firm performance as the dependent variable in Table 6.

I perform a modified Chow Test to determine if the Elite CEOs' firms perform differently. To perform the modified Chow Test I include a dummy variable equal to one for Elite CEOs and interact it with all explanatory variables (except for the year and industry dummies) then test the null that the coefficients on the Elite CEO dummy and all interaction terms are jointly equal to zero. If that is indeed the case, then something else is going on that is not captured in the firm performance models, such as excessive CEO managerial power or weak corporate governance.

4.5 Step 5: How Do Elite CEOs' Firms Perform Differently?

Question (4): If the firm performance of the different classes of CEOs' (Elite CEOs and Non-Elite CEOs) firms are best described with different firm performance models, which is what I expect, then how do the firms perform differently? That is, should the firm performance model for each class of CEO (Elite CEOs and Non-Elite CEOs) contain the same structure and the same variables? The research in this step assumes the same variables are contained in the both the Elite CEO and Non-Elite CEOs firm performance models and investigates whether the coefficients on these variables are different? For example, is the firm performance for Elite CEOs' firms more sensitive to firm sales than Non-Elite CEOs?

This step involves three additional cases (All CEOs, Non-Elite CEOs, and Elite CEOs) for each of the eight measures of firm performance as the dependent variable. I then run one sensitivity case on each of these twenty-four cases using a different method for ranking and classifying the CEOs. Furthermore, for each of the forty-eight cases I run both random-effects and fixed-effects on the firm-effects (I support using firm-effects

instead of CEO-effects in Section 6 Results), and then perform the Hausman test to determine which is appropriate.

I use the following empirical specification of firm performance for seven of the eight dependent variables (all but the market value to book value ratio which has a different specification):

$$\begin{aligned}
(\text{firm performance}_{i,j,t+\text{varies}}) = & \beta_0 + \beta_1 \ln(\text{Firm size}_{i,j,t}) + \beta_2 (\text{Stock volatility}_{i,j,t}) \\
& + \beta_3 (\text{Total liabilities}_{i,j,t} / \text{assets}_{i,j,t}) + \beta_4 (\text{PP \& } E_t / \text{assets}_{i,j,t}) \\
& + \beta_5 (\text{R \& } D_{i,j,t} / \text{assets}_{i,j,t}) + \beta_6 (\text{Market to Book ratio}_{i,j,t}) \\
& + \beta_7 \ln(\text{Salary}_{i,j,t}) + \beta_8 \ln(\text{Bonus}_{i,j,t}) \\
& + \beta_9 \ln(\text{Equity-based}_{i,j,t}) + \beta_{10} \ln(\text{Other}_{i,j,t}) \\
& + \beta_{11} (\text{CEO age}_{i,j,t}) + \beta_{12} (\text{CEO age}^2_{i,j,t}) + \beta_{13} (\text{CEO tenure}_{i,j,t}) \\
& + \beta_{14} (\text{Average Ratio}_{i,j,t}) + \beta_{15} (\text{Governance Index}_{i,j,t}) \\
& + \text{Industry dummies} + \text{Year dummies} + \varepsilon_{i,j,t}
\end{aligned} \tag{5}$$

I use the following empirical specification of firm performance for the market value to book value ratio:

$$\begin{aligned}
(\text{MarkettoBookRatio}_{i,j,t}) = & \beta_0 + \beta_1 (\text{NetIncome}_{i,j,t} / \text{assets}_{i,j,t}) + \\
& + \beta_2 (\text{Total liabilities}_{i,j,t} / \text{assets}_{i,j,t}) + \beta_3 (\text{PP \& } E_t / \text{assets}_{i,j,t}) \\
& + \beta_4 (\text{R \& } D_{i,j,t} / \text{assets}_{i,j,t}) + \\
& + \beta_5 (\text{CEO age}_{i,j,t}) + \beta_6 (\text{CEO age}^2_{i,j,t}) + \beta_7 (\text{CEO tenure}_{i,j,t}) \\
& + \beta_8 (\text{Average Ratio}_{i,j,t}) + \beta_9 (\text{Governance Index}_{i,j,t}) \\
& + \text{Industry dummies} + \text{Year dummies} + \varepsilon_{i,j,t}
\end{aligned} \tag{6}$$

where for both equations 5 and 6 subscripts i , j and t denote the firm, CEO and time, respectively.⁶ For this set of firm performance regressions I use the same explanatory variables and expect the same signs on the coefficients as described in Step 4 for equations 3 and 4, respectively; except, I now include the Average Ratio as an explanatory variable but do not include the Elite CEO dummy or Elite CEO interaction terms.⁷

The analysis of these regressions is a simple comparison of the statistical and economic significance of the coefficients on the variables from the three additional cases just described (All CEOs, Non-Elite CEOs, and Elite CEOs) and the case from Step 4. If the coefficients and their statistical significances are different, particularly on the Average Ratio, then something else is going on that is not captured in the CEO compensation models, such as excessive CEO managerial power or weak corporate governance. The sign and the statistical significance of the coefficient on Average Ratio should help explain whether or not Elite CEOs' firms outperform all other firms.

⁶ β represents the partial coefficient on the explanatory variable and ε represents the error term. *Industrydummies* represents the set of industry dummies and their respective partial coefficients. *Yeardummies* represents the set of year dummies and their respective partial coefficients.

⁷ The Average Ratio is the average of a CEO's CEO/Number_2 Ratio over a CEO's tenure as the CEO at a given firm. The CEO/Number_2 Ratio was first described in Section 3 and the Average Ratio is more fully developed in Section 6.

5 Data

In this section I describe in detail how I prepare the data set for this research in sub-section 5.1 and provide descriptive statistics and information on the data set in sub-section 5.2.

5.1 Data Set

Table 3 lists and describes the variables I use in my CEO compensation regressions, as more fully described in Steps 2 and 3 of Section 4. Table 5 lists and describes the variables I use in my firm performance regressions, as more fully described in Steps 4 and 5 of Section 4. In these tables I also note the source of the data for each variable and the source's name or code for the listed variables. Table 7 presents the data and sources used in prior research that I consider key to my dissertation. Following is a description of the process I followed to collect and prepare the data for this research.

I utilized the Wharton Research Data Services to collect three 'master' data files for the period 1993 through 2005 from the Compustat North America dataset (one data file from the Executive Compensation area and one data file from the Financial Statements area) and from the RiskMetrics (formerly IRRC) dataset.

Since my focus is on CEOs, I began building my dataset with the Executive Compensation ("ExecuComp") master data file which has information for the top five executives at each firm. I dropped observations that do not have any compensation data whatsoever. For the observations that are missing data for total direct compensation (variable *tdc1*), restricted stock grants (variable *rstkgrnt*), and stock options (variable *option_1*) but have data for variables *salary* or *bonus*; I set *tdc1* equal to *salary* plus

bonus. I created a variable *Equity* that is equal to restricted stock grants (*rstkgrnt*) plus stock options (*option_1*).

I created a new dummy variable *CEO* set equal to 1 if the ExecuComp variable *ceoann* was equal to the string 'CEO' and 0 otherwise. Unfortunately, some of the firms do not recognize any of the executives for a given firm-year as the CEO by the variable *ceoann*. For these firms I took two approaches to identifying the firm's CEO. First, I identify the firms that have a CEO for at least one other firm-year. For these firms, if it is obvious that the person who is the CEO in the firm-years with a non-missing *ceoann* value is also the CEO in the firm-year with the missing *ceoann* variable, then I manually change the *CEO* dummy variable to 1 for firm-years missing *ceoann*. Second, for the firms without a CEO for at least one firm-year, I ranked the executives by their respective total direct compensation by firm-year and deemed the highest ranking executive to be the CEO for the given firm-year.

I rank the 'non-CEO' executives by total direct compensation by firm-year and deemed the highest ranking non-CEO to be the Number 2 executive. I drop firm-years that do not have both a CEO and a Number 2 executive. I create a new variable *Ratio* that for a given firm-year is simply the ratio of the CEO's total direct compensation and the Number 2 executive's total direct compensation (previously defined as CEO/Number 2 Ratio). The use of CEO/Number_2 Ratio was discussed in Sections 3 and 4.

The CEO's age is an explanatory variable in my regressions but the variable *age* is missing data for 1,187 firm-years. However, for 407 of these observations the CEO's age is available in at least one firm-year but is missing data in other firm-year(s). For these 407 observations I added or subtracted, accordingly, from the CEO's age to fill in

the missing data. I created *CEO tenure* based on the number of years the CEO serves as CEO at a given firm in the sample. For the executives who were CEOs in 1993, I add the number of years they served as CEO at that firm prior to 1993 using the *becameceo* variable from ExecuComp.

I merge the ExecuComp data file, as it is at this point, with the Financial Statements data file (“Compustat”) by company identification number (variable *gvkey*) and *year*. I drop observations that are missing data for company *sales* and drop observations with *sales* less than \$25 million for a given firm-year (in 2005 dollars).

I set missing data equal to zero for the following variables (this is a common approach in the literature): (1) research and development (variable *data45*) was missing data for 18,240 observations; and (2) deferred taxes (variable *data74*) was missing 3,421 observations. I winsorize the data at the 99th percentile for three variables to mitigate the influence of outliers: 1) shareholder one-year return (variable *trs1yr*), 2) shareholder three-year return (variable *trs3yr*) and 3) shareholder five-year return (variable *trs5yr*).

The RiskMetrics (“IRRC”) master data file includes the Gompers, Ishii and Metrick governance index (variable *gindex*). Gompers, Ishii and Metrick (2003) develop the governance index as a proxy for shareholder rights based on 24 governance rules. The construction of the governance index for each firm is as follows: the authors add 1 point for every provision that restricts shareholder rights (increases managerial power). The governance index ranges from 1 (strongest shareholder rights) to 24 (weakest shareholder rights). Unfortunately, *gindex* is only available for years 1993, 1995, 1998, 2000, 2002, 2004, and 2006. I fill in the missing years by averaging the values for *gindex* in the preceding year and subsequent year, in cases where both the preceding year and

subsequent year are available (for 1996 and 1997 it is the average of the *gindex* values for 1995 and 1998 if both are available). For the other years missing data for *gindex* I set the missing value equal to the preceding year's value (if available) or the subsequent year's value (if available). I then use the "interpolate and extrapolate" features of Stata to fill in any remaining gaps.

I merge the IRRC working data file with the combined ExecuComp and Compustat data file by *cusip* and *year* and drop 71 observations that I can not match. I drop one of the two firm-years for CEOs that are serving as CEO at two firms in the same year and I drop the one firm with no industry identification. The final dataset has 23,528 firm-year observations for the period 1993-2005.

5.2 Descriptive Statistics

There are 2,746 firms and 13 years in the final dataset, for a total of 23,528 firm-years for most variables. Table 8 presents descriptive statistics (minimum, maximum, median and mean) for each of the variables in the regressions. Table 9 presents their pair-wise correlations. The variables include five measures of CEO compensation (salary, bonus, equity-based, Other, and total compensation), eight measures of firm performance (return on assets, return on equity, net income 3-year growth rate, net income 5-year growth rate, shareholder 1-year, 3-year and 5-year growth rate, and market to book value ratio), six firm characteristics (sales, stock price volatility, total liabilities to assets ratio, PP&E to assets ratio, R&D to assets ratio, and Governance Index), and three CEO characteristics (age, age², and tenure).

I now demonstrate that the firm-effects and CEO-effects are stable in the dataset. Table 10, panel A, indicates that on average 95% of the firms in the sample survive from one year to the next. I define a firm's life as the number of years it is in the sample. Table 10, panel B, shows that 88 percent of the firms have a life of 3 years or greater. The mean firm life is 8.6 years and the median is 9 years. Firms tend not to float in and out of the sample; only 58 of the 2,746 firms have gaps in the years that they are in the sample. Thus, the sample of firms is relatively stable from year to year. In other words, intertemporal variation in the data is not being driven by a changing composition of firms from year to year. This suggests that the entire sample of 23,528 firm-years can be used. However, I also run a sensitivity case including only the firms that are in the sample for the full 13 years for both the CEO compensation and firm performance regressions.

In sub-section 3.3 I refer to Figure 5 and point out that the top 10% group of CEOs (based on a ranking of total direct compensation) has a huge hump in its total direct compensation in the years leading up to 2000. A natural concern is that potentially some subset of firms represented within the top 10% group of CEOs is responsible for the anomaly. For example, the technology firms that came and went during the internet bubble in the late 1990s potentially could be the source of the hump in total direct compensation. Figure 6 addresses this concern by breaking the sample into three groups based on the number of years the firm is in the sample: (1) one to five year firm life, (2) six to nine year firm life, and (3) ten to thirteen year firm life. From Figure 6 it is clear that all three groups have similarly shaped humps in the total direct compensation. Thus, the sample is not being distorted by a changing mixture of firms.

Next I focus on CEOs and find that fewer than 150 of the 5,210 CEOs in the sample serve at more than one firm during the sample years, indicating that few CEOs move from one firm in the sample to another firm in the sample. Table 11 shows that approximately 64 percent of the CEOs have tenure (including service prior to 1993) longer than three years, with mean CEO tenure of 6.4 years and median of 4 years.

6 Results

In this section I present the results of my research in the order of the five steps outlined in Section 4.

6.1 Step 1: Develop the Classification of Elite CEOs

The purpose of this step is to categorize the CEOs into two classes: “Elite CEOs” and “Non-Elite CEOs” (the remaining CEOs). I began by calculating for each CEO in each year the CEO/Number_2 Ratio. I then calculate the mean CEO/Number_2 Ratio for each CEO for the years that the CEO serves as the CEO at the firm. I call this the “Average Ratio.” Note that each CEO has only one Average Ratio at a given firm, no matter how many years the individual is employed as the CEO. I then rank the CEOs by year using the Average Ratio. Figure 7 is a plot of the Average Ratio for all CEOs versus the fraction of the data and it indicates a slight bend in the curve starting at the 80th percentile and a distinct bend in the curve at the 90th percentile.⁸ In other words, the Average Ratio is pretty similar for about 90% of the CEOs, but it is much higher for the top 10%. Therefore, I classify a CEO as an Elite CEO for the entire firm-tenure if the CEO has an Average Ratio that is in the top 10% for at least one year during the CEO’s tenure.

The use of the Average Ratio leads to a definition of Elite CEO status that is relatively similar to the alternative of defining each year the Elite CEOs as those with a

⁸ The Average Ratio is about 2.0 at the 70th percentile and increases to 2.3 at the 80th percentile. The slope increases (almost doubles) for the next decile as the Average Ratio climbs to 2.9 at the 90th percentile. Thereafter, the slope continues to increase as the Average Ratio jumps to 3.7 at the 95th percentile. Figure 7 plots only the first 98% (by Average Ratio) because the top 2% of the sample have such large values (greater than 6.0) that they distort the scale of the figure if they are included in the figure. Although the top 2% are excluded from the figure, all observations are used in the subsequent empirical tests.

CEO/Number_2 Ratio in the top 10% for that year. In other words, the annual ranking of CEO/Number_2 Ratio is fairly “sticky” over time. For example, CEOs that have an CEO/Number_2 Ratio in the top 10% for at least one year also are in the top 10% for more than 80% of the years in which they are CEO. In addition, Table 12 shows the stickiness of Elite CEO status by firm-tenure using the Average Ratio approach as defined with a top 10% cutoff (for robustness, Table 12 also shows similar data for a top 15% cutoff). Notice that if a long-tenured CEO is classified as Elite in at least one year, then the CEO is classified as Elite in most years.

There are two reasons that I do not reclassify Elite CEOs each year, but instead classify a CEO as an Elite CEO for the entire firm-tenure if the CEO is above the cut-off level for at least one year during the CEO’s tenure. First, the Average Ratio approach mitigates the impact of golden hellos (sign on bonuses and other additional compensation in the first year on seat as the CEO) and golden goodbyes (severance or retirement packages in the last year of service) because it takes into account the CEO’s compensation in all years of the CEO’s firm-tenure. Second, the Average Ratio approach makes Elite CEO status time invariant for an Elite CEO’s firm-tenure. If I reclassified Elite CEOs each year then some CEOs would float in and out of Elite CEO status during their firm-tenure, creating anomalies in the firm-effect analysis.

It is important to recognize that the CEO/Number_2 Ratio is not just another way of expressing total compensation but instead captures a distinct aspect of CEO managerial power. Figure 8 presents a rank-order of the CEOs by their CEO/Number_2 Ratio and total direct compensation, with the ranking done by thirds (I chose to rank by thirds because it provides sufficient insight without the clutter caused by more ranking

categories). Figure 8 clearly demonstrates ranking by CEO/Number_2 Ratio is substantially different from ranking by total direct compensation. For example, if the CEO/Number_2 Ratio and total compensation were perfectly correlated, then 100% of the CEOs in the top one-third when ranked by the CEO/Number_2 Ratio would also be in the top one-third when ranked by total compensation. However, Figure 8 shows that only 51% of the top one-third CEOs ranked by CEO/Number_2 Ratio are also in the top one-third of CEOs ranked by total direct compensation. Furthermore, Table 1 (panel B) shows the pair-wise correlation of CEO total direct compensation and CEO/Number_2 Ratio is relatively low (in the range of 0.12 to 0.46 with an average of 0.24) for the period 1993 through 2005. The Spearman's rank-order correlation is also shown in Table 1 panel B, and it, too, is low.

Because all executives at a particular firm may be highly compensated, the level of CEO total compensation does not necessarily speak to a CEO's ability to extract excess compensation; in other words, there may be rational firm-specific reasons to have a highly compensated CEO and senior executives. However, as I have noted previously, the CEO/Number_2 Ratio is a proxy for CEO managerial power or influence over the board, which is responsible for setting CEO compensation. Therefore ranking and classifying the CEOs by their CEO/Number_2 Ratio provides insights on the different classes of CEOs' relative level of compensation and relative level of firm performance.

Some could argue that the CEOs' with the highest CEO/Number_2 Ratios are simply managing more complex firms and therefore deserve the relatively higher compensation. I argue that if a firm is more complex, then all executives' roles in managing the firm are more demanding and deserving of relatively higher compensation.

Several of the firm characteristic explanatory variables that I previously described in Section 4 are proxies for firm complexity. Therefore the CEO/Number_2 Ratios should stay relatively level within a firm after controlling for firm complexity.

Others could argue that the CEOs with the highest CEO/Number_2 Ratios simply have a better relationship with their respective boards or there is an element of cronyism where the CEO and the directors set each others salaries. I control for this “cronyism” issue by including the Gompers, Ishii and Metrick governance index as an explanatory variable.

For robustness tests, I develop a concentration index of each CEO’s compensation based on the top five executives’ compensation at each firm. The logic and support for this approach is that the relationship of the CEO’s compensation to the top five executives’ compensation is a measure of the CEO’s managerial power and ability to extract compensation. The technique I use for developing the concentration index of CEO compensation is analogous to the Herfindahl Index, also known as the Herfindahl-Hirschman Index. The Herfindahl Index is an indicator of the amount of competition among firms in an industry and is defined as the sum of the squares of the market shares of each individual firm. As such, it can range from close to 0 for an industry with many small firms to 1 for an industry with a single monopolistic producer.

My concentration index is the sum of squares of the top five executive’s respective share (percent) of the total compensation for the top five executives. In theory it can range from 0.2 if the top five executives are equally compensated to 1.0 if one of the executives receives all of the compensation paid to the top five executives.

Similar to Average Ratio, I rank and classify Elite CEOs based on the average compensation concentration index, denoted by “Average CCI.” Figure 9 is a plot of the Average CCI for all CEOs versus the fraction of the data and it indicates a distinct bend in the curve at the 80th through the 90th percentile.

In summary, I classify a CEO as an Elite CEO for the entire firm-tenure if the CEO has an Average Ratio that is in the top 10% for at least one year during the CEO’s tenure. I use this classification for my base cases for the CEO compensation regressions and the firm performance regressions. For robustness tests, in the CEO compensation regressions I use the Average Ratio with a top 20% cutoff, the Average CCI with a top 10% cutoff, and the Average CCI with a top 20% cut-off as sensitivity cases. As I show later, the results from the CEO compensation regressions using the definition of an Elite CEO based on a top 10% cutoff with the Average Ratio are robust to the alternative cutoffs and the use of the Average CCI. Therefore, I only use the Average CCI with a top 10% cut-off as a sensitivity case for the firm performance regressions.

From my base-case classification of Elite CEO status, based on the Average Ratio and a cut-off at the 90th percentile, Table 13 shows the number of CEOs and Elite CEOs by year. I note that the number and percent of Elite CEOs is increasing from year to year during the sample period. Figure 10 demonstrates that this is simply because the Average Ratio is increasing for All CEOs throughout the sample period; which, naturally results in more CEOs being above the 90th percentile in the second half of the sample period.⁹ It is interesting that even though the Average Ratio is increasing during the sample period, the

⁹ As a sensitivity case, I use the CEO/Number_2 Ratio to rank and classify CEOs with a 10% cut-off by year for Elite CEO status and find similar results as for my base case. However, this sensitivity case has the unfavorable characteristic that Elite CEO status is time variant (i.e., CEOs float in and out of Elite CEO status).

mean Average Ratios for All CEOs of 1.94 and Non-Elite CEOs of 1.66 are comparable to what the CEO/Number_2 Ratio was in the 1930s. This comparison is based on information from Baker (1939) that enables me to determine that the CEO/Number_2 Ratio for the top executive's compensation to the number two executive's compensation was about 1.7 in 1929 and 1.9 in 1936 for large firms.

After classifying CEOs, I perform a univariate analysis of the means and medians of all variables I use later in my multivariate tests. Table 14 presents these results. It is interesting to note that the mean and median for every component of compensation and the total direct compensation for the Elite CEOs are two to four times higher and statistically different at the 1% level compared to the respective amounts for Non-Elite CEOs. Yet, none of my eight measures of firm performance are statistically different at the 1% level, for *both* the mean and median, between the Elite CEOs and Non-Elite CEOs. In fact, the mean and median for only two of the eight measures of firm performance (net income 5-year growth rate and shareholder 5-year return) are higher and statistically different at the 5% level for Elite CEOs compared to Non-Elite CEOs. This comparison suggests that Elite CEOs receive much higher compensation than Non-Elite CEOs yet it is not clear at all that the Elite CEOs' firms perform better.

The comparison of the firm characteristic control variables between the two classes of CEOs is also quite interesting. The mean and median for firm sales, stock volatility, and liabilities to assets ratio are higher and statistically different at the 1% level for Elite CEOs' firms compared to the respective numbers for Non-Elite CEOs. This suggests that Elite CEOs' firms are larger, more complex, and riskier. In addition, the mean and median for the ratio of PP&E to assets is lower and statistically different at the

1% level for Elite CEOs' firms compared to the respective values for Non-Elite CEOs. This suggests that Elite CEOs firms are more difficult to monitor (firms are more difficult to monitor with decreasing levels of physical assets). It is also important to notice the mean and median for the governance index is also higher (which means weaker corporate governance) and statistically different at the 1% level for Elite CEOs' firms than for Non-Elite CEOs' firms. These observations suggest that by virtue of the weaker corporate governance, higher difficulty of monitoring, and higher risk at their firms, Elite CEOs have relatively more opportunity than Non-Elite CEOs to extract excess compensation without necessarily providing higher firm performance.

The foregoing comparison suggests that there are several statistically significant and interesting differences between the two classes of CEOs. The next 3 sub-sections present the results of my multivariate tests of CEO compensation models.

6.2 The Basic Unadjusted CEO Compensation Regression Model: A Comparison with Extant Literature

Before performing multivariate tests that employ the classification of Elite CEOs, I first estimate my basic compensation model (without any adjustments for Elite status) and compare the results with the extant literature to verify that my basic unadjusted model produces results similar to results in the existing literature. This sub-section demonstrates that my CEO compensation model and data are indeed comparable to similar CEO compensation models in extant literature.

As mentioned in Section 4, I run both random-effects and fixed-effects for all of my regressions. In most cases, Hausman tests indicated that the random-effects estimator

was not appropriate. Consequently, I use and present the results from the fixed-effects estimator throughout this section. However, before I ran the regressions I needed to determine whether it should be firm-effects or CEO-effects. I calculated the mean and standard deviation of the CEO/Number_2 Ratio by CEO and by firm. From that information I determined that the standard deviation of the CEO/Number_2 Ratio has a higher mean and varies more for firms than for CEOs. Therefore I use firm-effects for all regressions.

Table 15 lists the variables used in several comparable CEO compensation models in extant literature with total direct compensation as the dependent variable.¹⁰ Table 15 also reports the results from my regression with CEO total direct compensation as the dependent variable in the last column. The R^2 for extant CEO compensation models range from 0.08 to 0.80 with the majority in the range of 0.08 to 0.56. The R^2 for my CEO total direct compensation model is comparable at 0.39. Table 15 also presents the sign and the significance on the coefficients for variables used in the respective CEO compensation models. A comparison of the sign and the significance of the coefficients on the variables used in my CEO total direct compensation model are comparable to the results from extant literature. Other than a larger sample (more firms and more years), Table 15 confirms that my unadjusted model and data are similar to models and data in previous empirical studies. Therefore, my new results in the next two sub-sections are due to my adjustments for Elite CEO status rather than to any difference in data or model structure.

¹⁰ Table 15 is essentially a reproduction of Table 4 but includes information from my CEO compensation model with total direct compensation as the dependent variable.

6.3 Step 2: Are Elite CEOs Compensated Differently?

This sub-section presents the results of my research and shows that Elite CEOs are indeed compensated differently from Non-Elite CEOs. I begin with a review of my research question and methodology then present the results.

Question (1): Is the CEO compensation model that explains Elite CEO compensation different from the one-size-fits-all CEO compensation model? As described in Section 4, I estimate regressions with compensation measures as the dependent variables and a set of control variables as the independent variables, including an Elite CEO dummy variable and its interaction with all of the independent variables (except for the year and industry dummies). I then perform a modified Chow Test to test the null that the coefficients on the Elite CEO dummy and all interaction terms are jointly equal to zero. If the null is rejected, then the same model does not apply for Elite CEOs and Non-Elite CEOs. In other words, something is not captured in the typical CEO compensation models, such as excessive CEO managerial power of the Elite CEOs. Note that the CEO's managerial power may be due to superior performance or to weak corporate governance, an issue that I address later in this section.

Table 16 presents results of the modified Chow Tests. The rows of the table show results for regression models with different dependent variables, which are the four components of compensation (salary, bonus, equity, Other) and the total direct compensation. In addition, for robustness testing I repeat the regression for total direct compensation using a sub-sample containing only the firms that are in the sample for all thirteen years. Each column in Table 16 is for a different method of classifying Elite

CEOs. These are based on the Average Ratio with cut-offs at the top 10% and top 20%. For robustness, I also classify Elite CEOs based on the Average CCI index with cut-offs at 10% and 20%. In all cases, except for the bonus component of compensation, I reject the null at the 5% level (in fact most at the 1% level) that Elite CEO interaction terms are jointly equal to zero. Also, rejecting the null for both the full sample and the sub-sample containing only the firms that are in the sample for the full 13 years is evidence that I probably do not have a severe selection problem. Therefore, the answer to *Question 1* is that Elite CEOs are compensated differently than implied by the one-size-fits-all CEO compensation model.¹¹

The modified Chow Test includes the Elite CEO dummy term in the test of the coefficients being jointly equal to zero. A possibility for my finding that Elite CEOs are compensated differently is simply because they have a higher intercept (i.e., Elite CEOs might have higher compensation after controlling for other factors). Therefore as a sensitivity case, I run an alternate modified Chow Test to test the null that the coefficients on all Elite CEO interaction terms are jointly equal to zero (the Elite CEO dummy term is excluded from this test). Table 17 presents the results of the alternate modified Chow Test and they confirm that Elite CEOs are compensated differently than Non-Elite CEOs.¹²

¹¹ As sensitivity cases for robustness, I determined two alternate Average Ratios based on salary and salary plus bonus for ranking and classifying CEOs. I then ran regressions for all five measures of CEO compensation and also found that Elite CEOs are compensated differently than Non-Elite CEOs.

¹² As another sensitivity case for robustness, I ran a regression with total direct compensation as the dependent variable and interacted Elite CEO dummy with all explanatory variables and the variable *year*. Both the modified and alternate modified Chow Tests indicate Elite CEOs are compensated differently at the 1% level. None of the Elite CEO interacted *year* terms are significant at the 1% level.

Now that I have established that Elite CEOs are compensated differently, the natural follow-on question is “How Are Elite CEOs Compensated Differently?” I address this question in the next sub-section.

6.4 Step 3: How Are Elite CEOs Compensated Differently?

This sub-section presents the results of my research that investigates how Elite CEOs are compensated differently than Non-Elite CEOs. I begin with a review of my research question and methodology before presenting the results.

Question (2): If the compensation of different classes of CEOs (Elite CEOs and Non-Elite CEOs) are best described with different CEO compensation models, which is what I expect, then how are they compensated differently? The answer to *Question 1* is that Elite CEOs are compensated differently than Non-Elite CEOs. That being the case, the research in this step assumes the same variables are contained in the both the Elite CEO and Non-Elite CEOs compensation models and investigates whether the coefficients on these variables are different.

For this analysis I perform CEO compensation regressions both with and without the Elite CEO interaction terms. Tables 18 through 22 present the results of these regressions; with each table presenting the results for a different measure of CEO compensation as the dependent variable. For each table, Columns (1) and (2) are the results from a single regression including Elite CEO interaction terms; the coefficients on the independent variables are presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) show how Elites CEOs are compensated relative to the Non-Elite CEOs with respect

to the importance of particular control variables. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are essentially a frame of reference or benchmark for determining how Elite CEOs are compensated differently. The regression in column (3) shows the results that a researcher would obtain if the impact of Elite CEOs is ignored. As the following discussion will show, there are a couple of situations in which a researcher might draw an inappropriate conclusion with respect to either the significance or magnitude of a coefficient. As a reminder, I use firm fixed-effects in my regressions for reasons previously explained in sub-section 6.2.

Recall from Table 14 that the mean total direct compensation of \$8.6 million for Elite CEOs is higher and statistically different from the mean total direct compensation of \$3.6 million for Non-Elite CEOs. In general, the multivariate tests identify which independent variables explain the differences in compensation. In addition, tests in the previous sub-section demonstrated that the coefficients on explanatory variables are not identical for Elite CEOs and Non-Elite CEOs. The objective in this sub-section is to examine the results from the multivariate tests and identify differences in the ways that Elite and Non-Elite CEOs are compensated.

I discuss separately the regressions for each form of compensation presented in Tables 18-22, but I make a couple of general observations here. First, the dummy term for Elite CEOs is not significant at even a 10% level for any form of compensation. This indicates that the control variables in the regression models (rather than the intercept) explain the differences between Elite CEO compensation and Non-Elite CEO compensation. Second, the separate regressions for Non-Elite CEOs tend to have higher

explanatory power than the regressions for Elite CEOs. This suggests that the models used in extant literature might be better specified if they were adjusted for the influence of Elite CEOs.

Table 18 presents the results of the four CEO compensation regressions with the natural log of CEO total direct compensation as the dependent variable. An interesting observation is that the R-squared for the Non-Elite CEOs case, 0.45 in column (4), is higher than it is for either the All CEOs or Elite CEOs cases, 0.38 in column (3) and 0.27 in column (5), respectively. As I mentioned earlier, this suggests that the models used in extant literature might be better specified if they were adjusted for the influence of Elite CEOs.

Focusing on the results shown in Table 18, the coefficient on the market value to book value ratio is positive and statistically significant at the 1% level for Non-Elite CEO, as shown in columns (1) and (4). Furthermore, the Elite CEO interaction term on the market to book value ratio is also positive and statistically significant at the 1% level, see column (2). An interpretation of these results is that the compensation contracts for Elite CEOs have relatively more incentives (compared with the compensation contracts for Non-Elite CEOs) designed to mitigate CEOs shirking duties regarding the investment and growth opportunities reflected in the market to book value ratio. This interpretation is consistent with findings by Aggarwal and Samwick (2006) and Bertrand and Mullainathan (2003) that managers prefer the quiet life and therefore must have incentives to mitigate the underinvestment problem. A slightly different interpretation is that Elite CEOs simply receive relatively more compensation than Non-Elite CEOs for

the increasing complexity of managing firms with greater investment and growth opportunities.

Still reviewing Table 18, the coefficient on the PP&E to assets ratio is negative and statistically significant at the 1% level for Non-Elite CEOs, as shown in columns (1) and (4). This suggest that for Non-Elite CEOs the total direct compensation is decreasing with increasing levels of PP&E to assets ratio, possibly because if a greater percent of a firm's assets are in the form of physical assets then the firm is easier to monitor. However, the coefficient of the Elite CEO interaction term on the PP&E to assets ratio is positive and statistically significant at the 5% level. This suggests that Elite CEOs are compensated differently from Non-Elite CEOs with respect to their firms' asset intensity and either have incentives in their contracts to mitigate the shirking of duties regarding investment in PP&E or Elite CEOs are able to use their influence to extract more compensation based on increasing levels of the PP&E to asset ratio.

The economic significance of these results are as follows: (1) the Elite CEO receives an additional \$91 thousand in total direct compensation (relative to that of a Non-Elite CEO) for a 10 percent increase in the PP&E to asset ratio (at the mean for Elite CEOs this would be an increase of 2.7 percentage points from 27.0 percent to 29.7 percent for the ratio) and (2) the Elite CEO receives an additional \$128 thousand in total direct compensation (relative to that of a Non-Elite CEO) for a 10 percent increase in the market value to book value ratio (at the mean for Elite CEOs this would be an increase of 21.4 percentage points from 214.0 percent to 235.4 percent for the ratio).¹³

¹³ Refer to Table 14 for the summary statistics for these variables.

Finally from Table 18, the coefficient on the R&D to assets ratio is negative and statistically significant at the 1% level for Non-Elite CEOs, as shown in column (4). However, the coefficient is not statistically significant for All CEOs, see column (3). This indicates that the influence of the Elite CEOs masks the significance of the R&D to assets ratio in explaining Non-Elite CEOs' compensation. Furthermore, this suggests that a researcher might draw the inappropriate conclusion regarding the significance of the coefficient on the R&D to asset ratio in the one-size-fits-all CEO total compensation model.

Table 19 presents the results of four CEO compensation regressions with the natural log of CEO equity-based compensation as the dependent variable. Focusing on the results shown in column (2) of Table 19, the coefficient on the Elite CEO interaction term for Black-Scholes stock volatility is negative and statistically significant at the 1% level. An interpretation of this finding is that Elite CEOs are more adept than Non-Elite CEOs at using their CEO managerial power to reduce the personal risk associated with equity-based compensation when their firms have higher levels of stock volatility. However, keep in mind that the mean equity-based compensation for Elite CEOs is 2.7 times as great as the mean equity-based compensation for Non-Elite CEOs as shown in Table 14. Also, the coefficient on CEO tenure is positive and statistically significant at the 5% level for Non-Elite CEOs, as shown in column (4). However, the coefficient is not statistically significant for All CEOs, see column (3). This indicates that the influence of the Elite CEOs masks the significance of CEO tenure in explaining Non-Elite CEOs' compensation. Furthermore, this suggests that a researcher might draw the

inappropriate conclusion regarding the significance of the coefficient on CEO tenure in the one-size-fits-all CEO equity-based compensation model.

Table 20 presents the results of four CEO compensation regressions with the natural log of CEO Other compensation as the dependent variables. Focusing on the results shown in column (2) of Table 20, the coefficients on the Elite CEO interaction terms for the total liabilities to assets ratio and the PP&E to assets ratio are positive and statistically significant at the 5% level.

The coefficient on the Elite CEO interaction term for the total liabilities to assets ratio is positive and statistically significant at the 1% level, see column (2) in Table 20. However, the coefficient is not statistically significant for Non-Elite CEOs, see columns (1) and (4). An interpretation of this finding is that compensation contracts for Elite CEOs has more incentives (compared with the compensation contracts for Non-Elite CEOs) designed to compensate Elite CEOs for managing the additional risk associated with increasing levels of debt.

The positive coefficient for Elite CEOs on the PP&E to asset ratio is particularly interesting because the coefficient on the PP&E to assets ratio is negative and statistically significant for Non-Elite CEOs at the 1% level (this makes sense for Non-Elite CEOs because firms are easier to monitor with increasing levels of physical assets). The signs and the level of significance for these coefficients are the same as the previously discussed case with CEO total direct compensation as the dependent variable. The interpretation of these results is that the compensation contracts for Elite CEOs has relatively more Other compensation (compared with the compensation contracts for Non-Elite CEOs) when the firm has higher levels of tangible assets in the form of PP&E.

The economic significance of these results are as follows: (1) the Elite CEO receives an additional \$30 thousand in Other compensation (relative to that of a Non-Elite CEO) for a 10 percent increase in the PP&E to asset ratio (at the mean for Elite CEOs this would be an increase of 2.7 percentage points from 27.0 percent to 29.7 percent for the ratio) and (2) the Elite CEO receives an additional \$97 thousand in Other compensation (relative to that of a Non-Elite CEO) for a 10 percent increase in the total liabilities to assets ratio (at the mean for Elite CEOs this would be an increase of 5.9 percentage points from 59.0 percent to 64.9 percent for the ratio).¹⁴

Table 21 presents the results of four CEO compensation regressions with the natural log of CEO salary as the dependent variables. Focusing on the results shown in column (2) of Table 21, the coefficient on the Elite CEO interaction term for the total liabilities to assets ratio is positive and statistically significant at the 1% level. An interpretation of this result is that the compensation contracts for Elite CEOs has relatively more incentives (compared with the compensation contracts for Non-Elite CEOs) designed to compensate Elite CEOs for managing the additional risk associated with increasing levels of debt.

The economic significance of this result is as follows: (1) the Elite CEO receives an additional \$24 thousand in salary compensation (relative to that of a Non-Elite CEO) for a 10 percent increase in the total liabilities to assets ratio (at the mean for Elite CEOs this would be an increase of 5.9 percentage points from 59.0 percent to 64.9 percent for the ratio).

¹⁴ Refer to Table 14 for the summary statistics.

Table 22 presents the results of four CEO compensation regressions with the natural log of CEO bonus as the dependent variables. As mentioned in the previous subsection, the bonus compensation is not statistically different for Elite CEOs compared to Non-Elite CEOs.

In summary, Elite CEOs receive higher compensation and they are compensated differently from Non-Elite CEOs in the sense that a one-size-fits-all model is inappropriate. Furthermore, Elite CEOs have higher compensation and their additional compensation is explained by their interacted control variables in the models rather than by the Elite CEO dummy variable. Therefore future research should consider the influence of Elite CEOs on compensation models. In particular, it appears that the variables proxying firm risk, ease of monitoring the firm, and investments affect Elite CEO compensation and Non-Elite CEO compensation differently.

I now examine firm performance regressions to determine whether or not Elite CEOs' firms perform differently from Non-Elite CEOs' firms.

6.5 The Basic Unadjusted Firm Performance Model: A Comparison with Extant Literature

Before performing multivariate tests that employ the classification of Elite CEOs, I first estimate my basic firm performance model (without any adjustments for Elite status) and compare the results with the extant literature to verify that my basic unadjusted model produces results similar to results in the existing literature. This subsection demonstrates that my firm performance model is indeed comparable to similar firm performance models in extant literature.

Table 23 lists the variables used in several comparable firm performance models in extant literature; my results are in the last column.¹⁵ The R^2 for extant firm performance models range from 0.01 to 0.43 with the majority in the range of 0.01 to 0.17. The R^2 for my firm performance model is comparable in the range of 0.01 to 0.10 for my eight measures of firm performance. Generally speaking, the firm performance models do not have as much explanatory power as the CEO compensation models. Table 23 also presents the sign and the significance on the coefficients for variables used in the respective firm performance models. A comparison of the sign and the significance of the coefficients on the variables used in my firm performance model are qualitatively comparable to the results from extant literature.

The Mehran (1995) firm performance model is essentially a single cross-section and therefore would be expected to have higher R^2 than my pooled time-series cross-section. For comparison purposes, I ran single regressions each year for my data with the market to book value ratio used as a measure of firm performance (for comparability with Mehran (1995)). I found values of R^2 by year in the range of 0.05 to 0.38 which is comparable to Mehran's range of 0.03 to 0.43. Also, the cases in Daines, Nair and Kornhauser (2005) that have R^2 in the order of 0.3 had not only return on assets as the dependent variable but also the prior year return on assets as a control variable; because return on assets is fairly highly correlated from year to year, Daines et al. have fairly high explanatory power when they include the prior years' return on assets. The other Daines et al. cases have R^2 more in line with my firm performance model.

¹⁵ Table 23 is essentially a reproduction of Table 6 but includes information from my firm performance model.

Other than a larger sample (more firms and more years) and the differences noted above, Table 23 confirms that my unadjusted model and data are similar to models and data in previous empirical studies. Therefore, my new results in the next two sub-sections are due to my adjustments for Elite CEO status rather than to any difference in data or model structure.

6.6 Step 4: Do Elite CEOs' Firms Perform Differently?

This sub-section presents the results of my research that finds that Elite CEOs' firms do perform differently than Non-Elite CEOs' firms. I begin with a review of my research question and methodology then present the results.

Question (3): Is the firm performance model that explains Elite CEOs' firms' performance different from the one-size-fits-all firm performance model? Asked another way, does the one-size-fits-all firm performance model apply for Elite CEOs' firms? For this analysis I include an Elite CEO dummy variable and its interaction with all of the explanatory variables (except for the year and industry dummies) in the firm performance regressions. I then perform a modified Chow Test to determine if the Elite CEO interaction terms are jointly equal to zero.

This research specifically investigates whether or not Elite CEOs' firms perform differently than Non-Elite CEOs' firms. If the same one-size-fits-all firm performance model does not apply to all CEOs' firms, then existing models distort the significance of the variables that are in the firm performance regression with respect to the impact they have on the Elite CEOs' firms. This of course suggests that we do not fully understand

the performance of Elite CEOs' firms and have possibly been underestimating the role of CEO managerial power in determining firm performance.

Table 24 presents results of the modified Chow Tests. The rows of the table show results from regressions with eight different measures of firm performance as the dependent variable. Each column in Table 24 is for a different method of classifying Elite CEOs. These are based on the Average Ratio with cut-off at the top 10% and for robustness I also classify Elite CEOs based on the Average CCI index with cut-off at 10%. In all cases, except for return on equity, I reject the null at the 1% level that Elite CEO interaction terms are jointly equal to zero. Therefore, the answer to *Question 3* is that Elite CEOs' firms perform differently than implied by the one-size-fits-all firm performance model.

The described modified Chow Test includes the Elite CEO dummy term in the test of the coefficients being jointly equal to zero. A possibility for my finding that Elite CEOs' firms perform differently is simply because they have a higher intercept (although the univariate tests in Table 14 do not indicate that Elite CEOs' firms perform differently). Therefore as a sensitivity case, I run an alternate modified Chow Test to test the null that the coefficients on all Elite CEO interaction terms are jointly equal to zero (the Elite CEO dummy is exclude from this test). Table 25 presents the results of the alternate modified Chow Test and the results tell the same story that Elite CEOs' firms perform differently than Non-Elite CEOs' firms.

I demonstrated in sub-sections 6.3 and 6.4 that Elite CEOs receive higher and different compensation than Non-Elite CEOs and have now established that Elite CEOs' firms perform differently. Do Elite CEOs receive this substantially higher compensation

because they lead their firms to superior performance compared to Non-Elite CEOs' firms? Or, is it because the Elite CEOs have undue influence over their respective boards for extracting excessive compensation even though their firms perform relatively worse than non-Elite CEOs' firms? The foregoing leads to the natural follow-on research question: "How do Elite CEOs' firms perform differently?" I address this question in the next sub-section.

6.7 How Do Elite CEOs' Firms Perform Differently?

This sub-section presents the results of my research that investigates how Elite CEOs' firms perform are differently than Non-Elite CEOs' firms. I begin with a review of my research question and methodology then present the results.

Question (4): If the firm performance of the different classes of CEOs' (Elite CEOs and Non-Elite CEOs) firms are best described with different firm performance models, which is what I expect, then how do the firms perform differently? That is, should the firm performance model for each class of CEO (Elite CEOs and Non-Elite CEOs) contain the same structure and the same variables? The research in this step assumes the same variables are contained in the both the Elite CEO and Non-Elite CEOs firm performance models and investigates whether the coefficients on these variables are different.

For this analysis I perform firm performance regressions both with and without the Elite CEO interaction terms. Tables 26 through 33 present the results of these regressions; with each table presenting the results for a different measure of firm performance as the dependent variable. For each table, Columns (1) and (2) are the

results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) show how Elites CEOs' firms perform differently than Non-Elite CEOs' firms. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs' firms, Non-Elite CEOs' firms, and Elite CEOs' firms, respectively. I use firm fixed-effects in my regressions for reasons previously explained in sub-section 6.2.

I discuss the results for each measure of performance separately, but it is worthwhile pointing out now that the coefficient on the Elite CEO dummy variable (column (2) of Tables 26-33) is never positive and statistically significant. This suggests that after controlling for other factors, Elite CEOs' firms do not have higher performance.

Table 26 presents the results of the four firm performance regressions with the forward shareholder 5-year return as the dependent variable. The coefficient on market value to book value ratio is negative and statistically significant at the 1% level for All CEOs' firms and Non-Elite CEOs' firms (see columns (1), (3) and (4)); but, notice the coefficient is incrementally more negative for Elite CEOs' firms (see columns (2) and (5)). This implies that an increasing market value to book value ratio (a proxy for growth opportunities which are difficult to monitor) for a firm, leads to reduced forward shareholder 5-year return for Non-Elite CEOs' firms and an even bigger reduction for Elite CEOs' firms. There are two possible interpretations for this result. First, because firms with higher levels of market to book value ratio are more difficult to monitor, CEOs of such firms are able to shirk duties which leads to poor future firm performance; if Elite CEOs have more power then this suggests that Elite CEOs are able to shirk more in firms

that are difficult to monitor. Second, it may be evidence of long term reversals of firm performance (i.e., the current market to book value is high because recent shareholder returns have been high but the forward shareholder returns reverse). However, it is not clear why the reversal would be more pronounced for Elite CEOs' firms.

The coefficient on the natural log of equity-based compensation is negative and statistically significant at the 1% level for All CEOs and Non-Elite CEOs (see columns (1), (3) and (4)); but, notice the coefficient on the Elite CEO interaction term is positive and statistically significant at the 5% level (see column (2)). This suggests awarding additional equity-based compensation reduces forward shareholder 5-year return for Non-Elite CEOs' firms but improves forward shareholder 5-year return for Elite CEOs' firms. However, no coefficient on any other component of CEO compensation is statistically different for Elite CEOs which implies that the additional compensation that Elite CEOs receive relative to Non-Elite CEOs does not translate to better forward 5-year shareholder return.

The coefficients on Average Ratio in columns (3), (4), and (5) of Table 26 tell an interesting story. The coefficient on Average Ratio is positive and statistically significant at the 1% level for All CEOs and Non-Elite CEOs but is not statistically significant for Elite CEOs; which suggests the result for All CEOs is being driven by Non-Elite CEOs. Considering that the mean Average Ratio is 4.18 for Elite CEOs and only 1.63 for Non-Elite CEOs it appears the higher compensation paid to Elite CEOs does not translate to higher shareholder 5-year return for Elite CEOs' firms. This result indicates that firm performance initially improves with increasing levels of the Average Ratio up to a point, but then any further increase to the Average Ratio does not benefit firm performance. An

interpretation of this finding is that the market (shareholders) responds favorably to increasing levels of this proxy for CEO managerial power, possibly as a signal of CEO ability and leadership, but the market does not reward excessive levels of the Average Ratio such as received by Elite CEOs.

Table 27 presents the results of the four firm performance regressions with the forward shareholder 3-year return as the dependent variable. As expected, the results and the interpretation of the results are very similar to the story told by using the forward shareholder 5-year return as the dependent variable.

Similar to the results for the forward shareholder 5-year returns, Tables 27 shows the coefficient on market value to book value ratio is negative and statistically significant at the 1% level for All CEOs' firms and Non-Elite CEOs' firms (see columns (1), (3) and (4)); but, notice the coefficient is incrementally more negative for Elite CEOs (see columns (2) and (5)). This implies that an increasing market value to book value ratio (a proxy for growth opportunities which are difficult to monitor) for a firm, leads to reduced forward shareholder 3-year return for Non-Elite CEOs' firms and an even bigger reduction for Elite CEOs' firms.

In contrast to the results for the forward shareholder 5-year returns, the coefficient on the natural log of bonus compensation is negative and statistically significant at the 1% level for All CEOs and Non-Elite CEOs (see columns (1), (3) and (4)); but, notice the coefficient on the Elite CEO interaction term is positive and statistically significant at the 5% level (see column (2)). This suggests awarding additional bonus compensation reduces forward shareholder 3-year return for Non-Elite CEOs' firms but improves forward shareholder 3-year return of Elite CEOs' firms. However, no coefficient on any

other component of CEO compensation is statistically different for Elite CEOs which implies that the additional compensation that Elite CEOs receive relative to Non-Elite CEOs does not translate to better forward shareholder 3-year return.

Still reviewing Table 27, the coefficient on the R&D to asset ratio is not statistically significant for All CEOs' firms and Non-Elite CEOs' firms but the Elite CEO interaction term is positive and statistically different at the 1% level for Elite CEOs' firms (see column (2)). As the ratio of R&D to assets is a proxy for technical complexity, this suggests that Elite CEOs' firms with increasing levels of technical complexity are more skilled at increasing forward 3-year shareholder return. However, this is an odd finding for two reasons. First, the Elite CEO interaction on the R&D to assets ratio is not statistically significant for any other of my seven measures of forward firm performance. Second, increasing levels of the market to book value ratio and the R&D to asset ratio individually indicate higher firm complexity and higher difficulty in monitoring; yet, the signs on the respective Elite CEO interaction terms are moving in opposite directions.¹⁶

The coefficients on Average Ratio in columns (3), (4), and (5) of Table 27 tell the exact same interesting story as learned from Table 26. The coefficient on Average Ratio is positive and statistically significant at the 1% level for All CEOs and Non-Elite CEOs but is not statistically significant for Elite CEOs. Considering that the mean Average Ratio is 4.18 for Elite CEOs and only 1.63 for Non-Elite CEOs it appears the additional compensation paid to Elite CEOs does not translate to higher shareholder 3-year return for Elite CEOs' firms.

¹⁶ The market to book value ratio and the R&D to asset ratio only have a 0.06 pair-wise correlation, see Table 9.

Table 28 presents the results of the four firm performance regressions with the forward shareholder 1-year return as the dependent variable. The coefficients on the market value to book value ratio tell the exact same story as using the forward shareholder 3-year and 5-year returns. Which is that an increasing market value to book value ratio (a proxy for growth opportunities which are difficult to monitor) for a firm, leads to reduced forward shareholder 1-year return for Non-Elite CEOs' firms and an even bigger reduction for Elite CEOs' firms.

The coefficient on the natural log of equity-based compensation is negative and statistically significant at the 1% level for All CEOs (see column (3)) but is not statistically significant for Non-Elite CEOs (see column (4)). However, notice the coefficient on the Elite CEO interaction term (see column (2)) and the coefficient for Elite CEOs (see column (5)) are negative and statistically significant at the 1% level. This suggests awarding additional equity-based compensation does not impact forward shareholder 1-year return for Non-Elite CEOs' firms but reduces the forward shareholder 1-year return of Elite CEOs' firms. However, the coefficient on the bonus component of CEO compensation is positive and statistically different for Elite CEOs which implies that the additional bonus compensation that Elite CEOs receive relative to Non-Elite CEOs does translate to better forward 1-year shareholder return.

Still referring to Table 28, the coefficient on the measure of stock volatility is negative and statistically different for Elite CEOs' firms but is not statistically significant for All CEOs' firms or Non-Elite CEOs' firms. This suggests that Elite CEOs' firms are less adept than Non-Elite CEOs' firms at managing the underlying source of risk that causes stock volatility. Also, the coefficients on Average Ratio are not statistically

significant for All CEOs, Non-Elite CEOs or Elite CEOs. This suggests that increasing levels of this proxy for CEO managerial power does not impact forward shareholder 1-year return. Said another way, increasing CEO compensation relative to the Number 2 executive does not improve the forward 1-year shareholder return.

Table 29 presents the results of the firm performance regressions with the market value to book value ratio as the dependent variable. The coefficient on the net income to asset ratio interaction term is negative and statistically different at the 1% level for Elite CEOs' firms (see column (2)) but the coefficient is positive and statistically significant at the 1% level for Elite CEOs' firms (see column (5)). Also, notice the coefficient is positive and statistically significant at the 1% level for Non-Elite CEOs' firms (see columns (1) and (4)). These findings suggest the market rewards firms with a higher market to book value ratio for increasing levels of net income to assets but not as much so for Elite CEOs' firms.

As shown on Table 29, the coefficient on the Average Ratio is negative and statistically significant at the 5% level for Non-Elite CEOs but is even more negative and statistically significant at the 1% level for Elite CEOs. The interpretation is that higher levels of CEO managerial power, as measured by the Average Ratio, result in decreasing levels of the market value to book value ratio for their firms. This finding implies that higher Average Ratio leads to reduced market to book value for Non-Elite CEOs' firms and an even bigger reduction for Elite CEOs' firms. Also, the Elite CEO dummy is negative and statistically significant at the 10% level; implying that after controlling for other factors, Elite CEOs' firms have less value. All of the foregoing suggests that the

market does not respond favorably to Elite CEOs' firms or to increasing levels of the Average Ratio.

Table 30 presents the results of the four firm performance regressions with the forward net income 5-year growth rate as the dependent variable. The coefficient on stock volatility is positive and statistically different at the 1% level for Elite CEOs' firms (see column (2)). This suggests that Elite CEOs' firms convert increasing level of stock volatility into higher levels of forward net income 5-year growth rate. However, the coefficient on PP&E to asset ratio is negative and statistically different at the 1% level for Elite CEOs' firms (see column (2)). This implies increasing levels of this ratio hurts the forward net income 5-year growth rate.

The coefficients on the market value to book value ratio as seen on Table 30 tell the exact same story as several other measures of firm performance. An increasing market value to book value ratio (a proxy for growth opportunities which are difficult to monitor) for a firm, leads to reduced forward net income 5-year growth rate for Non-Elite CEOs' firms and it is an even bigger reduction for Elite CEOs' firms.

The coefficient on the natural log of equity-based compensation is negative and statistically significant at the 1% level for All CEOs (see column (3)) and is statistically significant at the 5% level for Non-Elite CEOs (see column (4)). However, notice the coefficient on the Elite CEO interaction term (see column (2)) and the coefficient for Elite CEOs (see column (5)) are negative and statistically significant at the 5% level. This suggests awarding additional equity-based compensation hurts forward net income 5-year growth rate for Non-Elite CEOs' firms but hurts forward performance by this measure even more so for Elite CEOs' firms.

The final lesson from Table 30 is that the coefficient on the Average Ratio is not statistically significant for any class of CEO. This implies that increasing the level of CEO managerial power, as measured by the Average Ratio, does not impact forward net income 5-year growth rate.

Table 31 presents the results of the four firm performance regressions with the forward net income 3-year growth rate as the dependent variable. The coefficients on the market value to book value ratio tell the exact same story as several other measures of firm performance. An increasing market value to book value ratio (a proxy for growth opportunities which is difficult to monitor) for a firm, leads to reduced forward net income 5-year growth rate for Non-Elite CEOs' firms and it is the same but even worse for Elite CEOs' firms.

The coefficient on the natural log of equity-based compensation is not statistically significant for All CEOs or Non-Elite CEOs. However, notice the coefficient on the Elite CEO interaction term is negative and statistically different at the 5% level (see column (2)). This suggests awarding additional equity-based compensation does not impact the forward net income 3-year growth rate for Non-Elite CEOs' firms but reduces the forward net income 3-year growth rate for Elite CEOs' firms. However, the coefficient on the Other component of CEO compensation is positive and statistically different for Elite CEOs which implies that the additional Other compensation that Elite CEOs receive relative to Non-Elite CEOs does translate to better forward net-income 3-year growth rate.

The most interesting information from Table 31 is that the coefficient on the Average Ratio is not statistically significant for All CEOs or Non-Elite CEOs but is

negative and statistically significant at the 1% level for Elite CEOs. The interpretation is that higher levels of CEO managerial power hurts forward net income 3-year growth rate for Elite CEOs' firms.

Table 32 presents the results of the four firm performance regressions with the forward return on assets as the dependent variable. The most interesting information from this table is that the coefficient on the Average Ratio is positive and statistically significant at the 1% level for Non-Elite CEOs but is negative and statistically significant at the 5% level for Elite CEOs. The interpretation is that higher levels of CEO managerial power helps forward return on assets for Non-Elite CEOs' firms but hurts forward return on assets for Elite CEOs' firms.

The coefficient on stock volatility is negative and significantly different for Elite CEOs' firms (see column (2)), which suggests higher stock volatility diminishes forward return on assets. However, the coefficients on total liabilities to asset ratio and the market value to book value ratio are both positive and statistically different (see column (2)), which increasing levels of these variables improves forward return on assets.

Table 33 presents the results of the four firm performance regressions with the forward return on equity as the dependent variable. I include this table for reference but do not review the results herein as the modified Chow Test indicates that Elite CEOs' firms do not perform differently as measured by the forward return on equity.

In summary, the two most consistent and therefore most interesting findings from this sub-section relate to the market to book value ratio and the Average Ratio. The coefficient on the market to book value ratio is negative and statistically significant for five of the six relevant measures of forward firm performance (shareholder 5-year return,

shareholder 3-year return, shareholder 1-year return, net income 5-year growth rate, and net income 3-year growth rate) for the cases with All CEOs' firms and Non-CEOs' firms.¹⁷ Furthermore, for these five measures of forward firm performance, the Elite CEO interaction on the market to book value is negative and statistically significant. This implies that an increasing market value to book value ratio (a proxy for growth opportunities which are difficult to monitor) for a firm, leads to reduced firm performance for Non-Elite CEOs' firms and an even bigger reduction for Elite CEOs' firms. There are two possible interpretations for this result. First, because firms with increasing levels of market to book value ratio are more difficult to monitor and Elite CEOs have more power, Elite CEOs are able to shirk even more at firms where monitoring is difficult. Second, it may be evidence of long term reversal of firm performance (i.e., the current market to book value is high because recent shareholder returns have been high but then forward shareholder returns just reverses). However, it is not clear why the reversal would be more pronounced for Elite CEOs' firms.

The coefficients on the Average Ratio, a proxy for CEO managerial power, tell the most interesting story. Increasing levels of CEO managerial power do not benefit firm performance for Elite CEOs' firms for four measures of firm performance (shareholder 5-year return, shareholder 3-year return, shareholder 1-year return, and net income 5-year growth rate). Increasing levels of CEO managerial power hurts firm performance for Elite CEOs' firms for three measures of firm performance (market to book value ratio, net income 3-year growth rate, and return on assets). That is fairly

¹⁷ The two of the eight measures of firm performance that are not relevant for this generalization regarding the coefficients on the market to book value ratio as a control variable are (1) the market to book value ratio as the dependent variable for obvious reason and (2) return on equity because it is not statistically different for Elite CEOs' firms.

condemning evidence considering that the mean Average Ratio and the mean CEO total direct compensation are each roughly 2.5 times greater for Elite CEOs compared to Non-Elite CEOs.¹⁸ This finding indicates that Elite CEOs receive higher compensation than Non-Elite CEOs not because Elite CEOs lead their firms to superior performance but because the Elite CEOs have undue influence over their boards.

¹⁸ See Table 14 for summary statistics.

7 Closing Comments

A particular body of research examines the issue of linking executive pay to firm performance by focusing on the observation that CEO compensation varies widely across firms, even within the same industry. This research uses CEO characteristics, (such as “superstar” or “celebrity” status, “reputation”, “skill”, “managerial power”, age, dual role as CEO and Chairman of the Board, and percent of firm ownership by the CEO) and firm characteristics (such as size, complexity, growth opportunities, and leverage) to explain ‘why’ CEOs’ compensation varies widely in cross-section. However, this research assumes that the same compensation model (i.e., structure of the model, explanatory variables, and coefficients on those variables) can be applied to all CEOs (this assumption is implicit in the use of all CEO’s in the samples for which the models are tested). If you will, extant research utilizes a one-size-fits-all CEO compensation model for empirical analysis. Furthermore, much of this research also examines firm performance and similarly utilizes a one-size-fits-all firm performance model.

Holmstrom and Kaplan (2003) shed a different light on this issue by suggesting that only a few CEOs have sufficient power or influence to extract excessive compensation. They note that in 2001 the top ten CEOs of U.S. firms received average option grants of \$170 million, while the median value of total compensation for CEOs of the S&P 500 companies was only about \$7 million. The authors argue that “U.S. executive pay may not be quite the runaway train that has been portrayed in the press.” However, I find no research that thoroughly investigates the impact and distortions that a class of ‘only a few’ powerful CEOs (i.e., those with sufficient levels of managerial power or influence to extract excessive compensation) has on the one-size-fits-all CEO

compensation and firm performance models. In addition, the literature has not examined whether the firms that are led by such CEOs experience superior performance. This void in the literature motivates my research.

To empirically test the Holmstrom and Kaplan hypothesis that only a few powerful CEOs can extract excessive compensation, a proxy for CEO managerial power is required. I develop two separate proxies for CEO managerial power that I use to rank and classify the CEOs.¹⁹ First, I use the ratio of CEO total direct compensation to the total direct compensation of the highest paid executive, other than the CEO, as a proxy for CEO managerial power. Second, for robustness and sensitivity tests I develop a concentration measure of CEOs compensation, based on the top five executive's compensation at each firm, which is analogous to the concentration ratio used to measure industry competitiveness (the Herfindahl Index).

I hypothesize that the most powerful (or "Elite") class of CEOs, as defined by my proxies, receives excessive compensation relative to the class of other (or "Non-Elite") CEOs. For this hypothesis my empirical test is whether Elite CEOs receive higher and different compensation, after controlling for other variables, than Non-Elite CEOs; and if so, how are Elite CEOs compensated differently? Furthermore, I hypothesize that Elite CEOs' firms do not experience superior performance compared to Non-Elite CEOs' firms. For this hypothesis my empirical test is whether Elite CEOs' firms perform differently, after controlling for other variables, than Non-Elite CEOs' firms; and if so, how do Elite CEOs' firms perform differently?

¹⁹ I demonstrate that ranking the CEOs by my proxy for CEO managerial power is not the same as simply ranking the CEOs by their total direct compensation.

I perform regressions with CEO compensation as the dependent variable, the common independent variables in extant literature, an Elite CEO dummy variable, and Elite CEO interaction terms with the independent variables. Furthermore, I perform regressions with eight measures of firm performance as the dependent variable, the common independent variable utilized in extant literature, an Elite CEO dummy term, Elite CEO interaction terms, and the Average Ratio as an explanatory variable.

My empirical results show that one-size-fits-all models can be rejected. The estimated coefficients in compensation models and performance models are different for Elite CEOs as compared to Non-Elite CEOs. Also, firms with Elite CEOs do not have higher performance. In fact, I find evidence suggesting that the presence of an Elite CEO hurts firm performance and value. This suggests that Elite CEOs extract excessive compensation due to influence over their respective boards rather than to superior performance. These findings have two important implications. First, it is possible that previous empirical research results and conclusions regarding the link between CEO compensation and firm performance might be distorted because previous studies have failed to explicitly address the impact caused by a small number of highly paid and influential CEOs. Second, it is important for shareholders, boards, and policy makers to understand the link (if one exists) between CEO managerial power and firm performance.

Holmstrom and Kaplan (2003) find that the United States corporate governance system is better at resolving agency problems than other countries' corporate governance systems based on comparing respective market returns. Their findings suggest the United States corporate governance system is not broken. On the other hand, their findings do

not tell us whether or not recent increases in CEO (executive) compensation have improved the system with respect to firm performance.

Even though the United States corporate governance system was and may still be the number one system in the world that does not mean that the tremendous increase in CEO compensation from 1993 through 2005 was not a step backward in the evolution of the United States corporate governance system.

In closing, I find that Elite CEOs receive higher compensation than Non-Elite CEOs not because Elite CEOs lead their firms to superior performance but because the Elite CEOs have undue influence over their boards for extracting excessive compensation. These findings suggest that we may have indeed taken a step backward with our corporate governance system.

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APPENDIX

CEO Total Direct Compensation

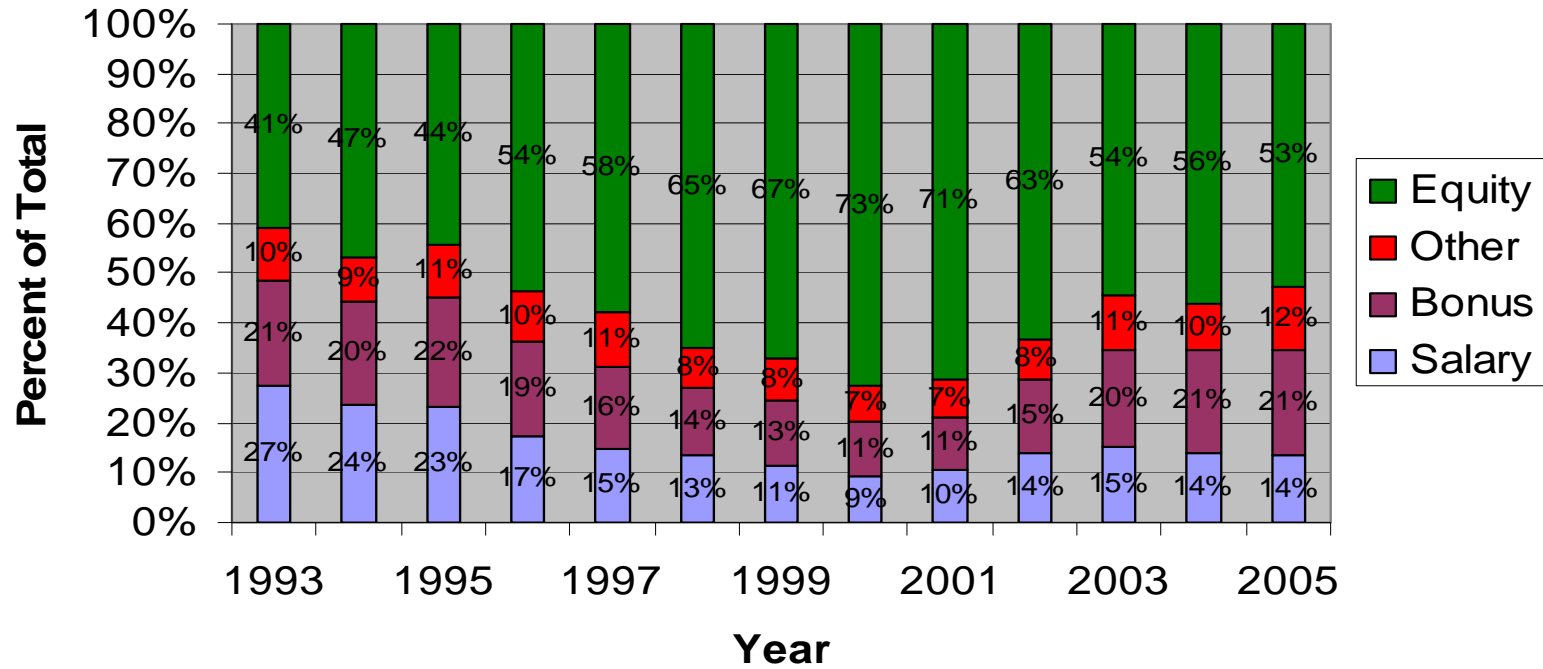


Figure 1. Component's Percentage Contribution to CEOs' Total Compensation.

Note: The CEO compensation data are from ExecuComp for the years 1993-2005. This bar graph presents the percent each component of compensation contributes to the mean CEO total direct compensation for all firms in the sample, by year.

CEO Components of Equity Compensation

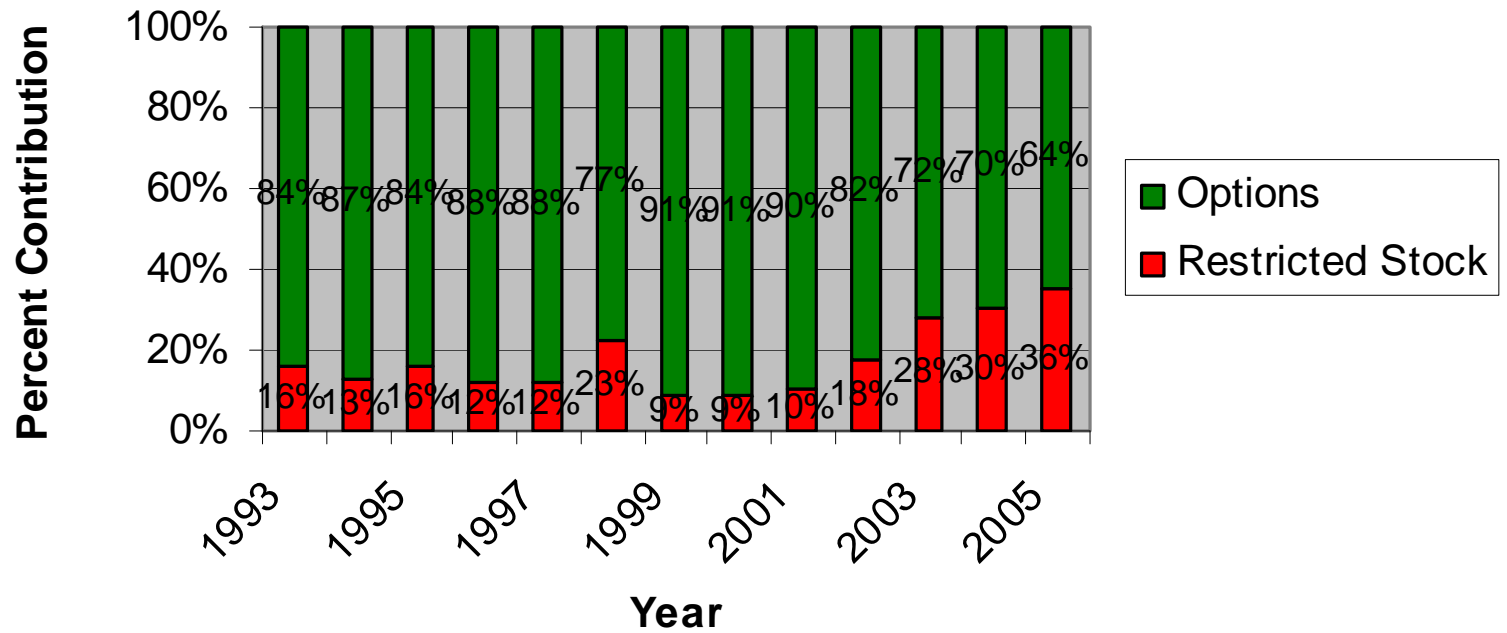


Figure 2. Components of CEOs Equity-Based Compensation.

Note: The CEO compensation data are from ExecuComp for the years 1993-2005. This bar graph presents the percent that stock options and restricted stock grants each contribute to the mean CEO equity-based compensation for all firms in the sample, by year.

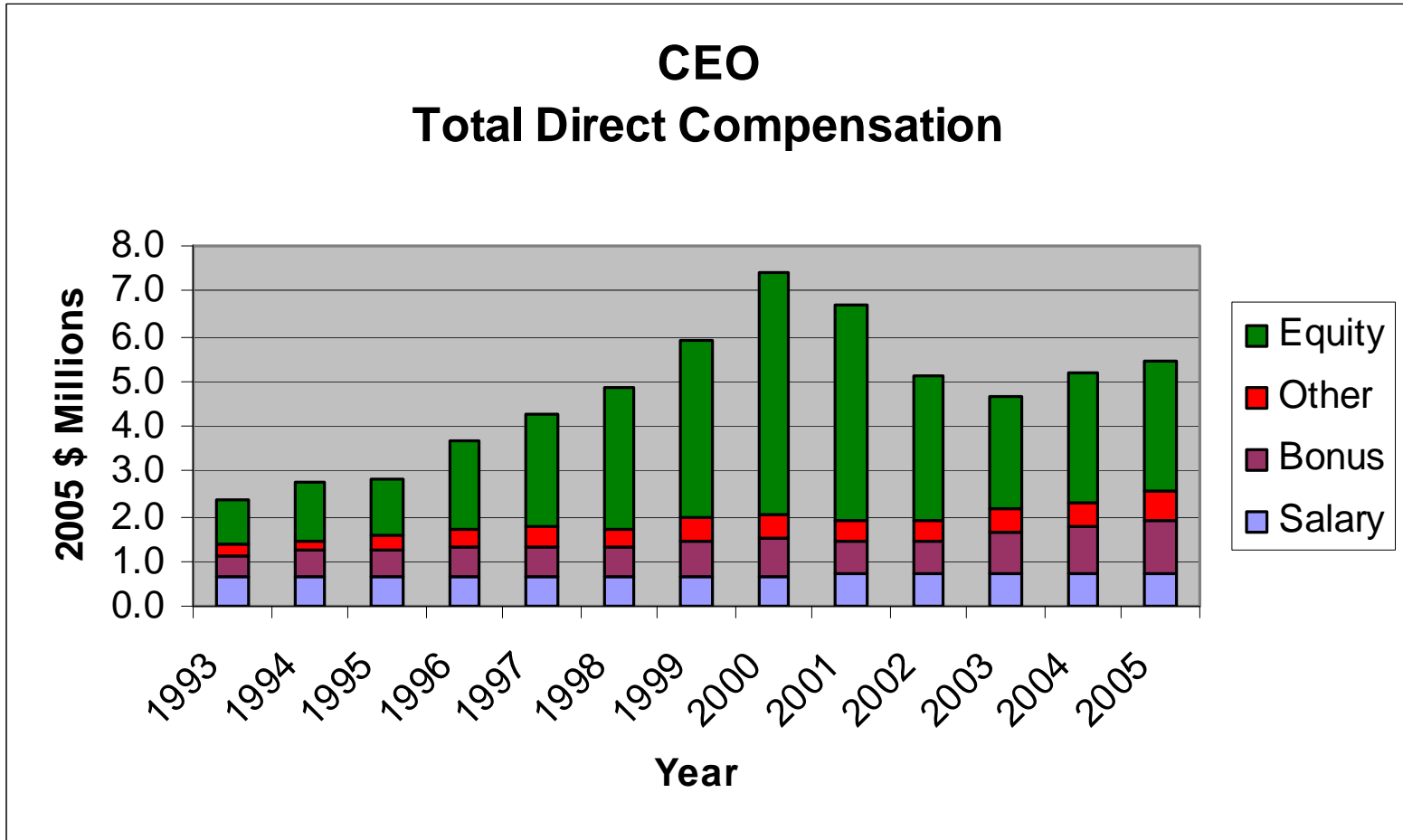


Figure 3. Component's \$ Contribution to CEOs' Total Compensation.

Note: The CEO compensation data are from ExecuComp for the years 1993-2005, adjusted for inflation and expressed in 2005 dollars. This stacked bar graph presents the mean CEO total direct compensation and its components for all firms in the sample by year.

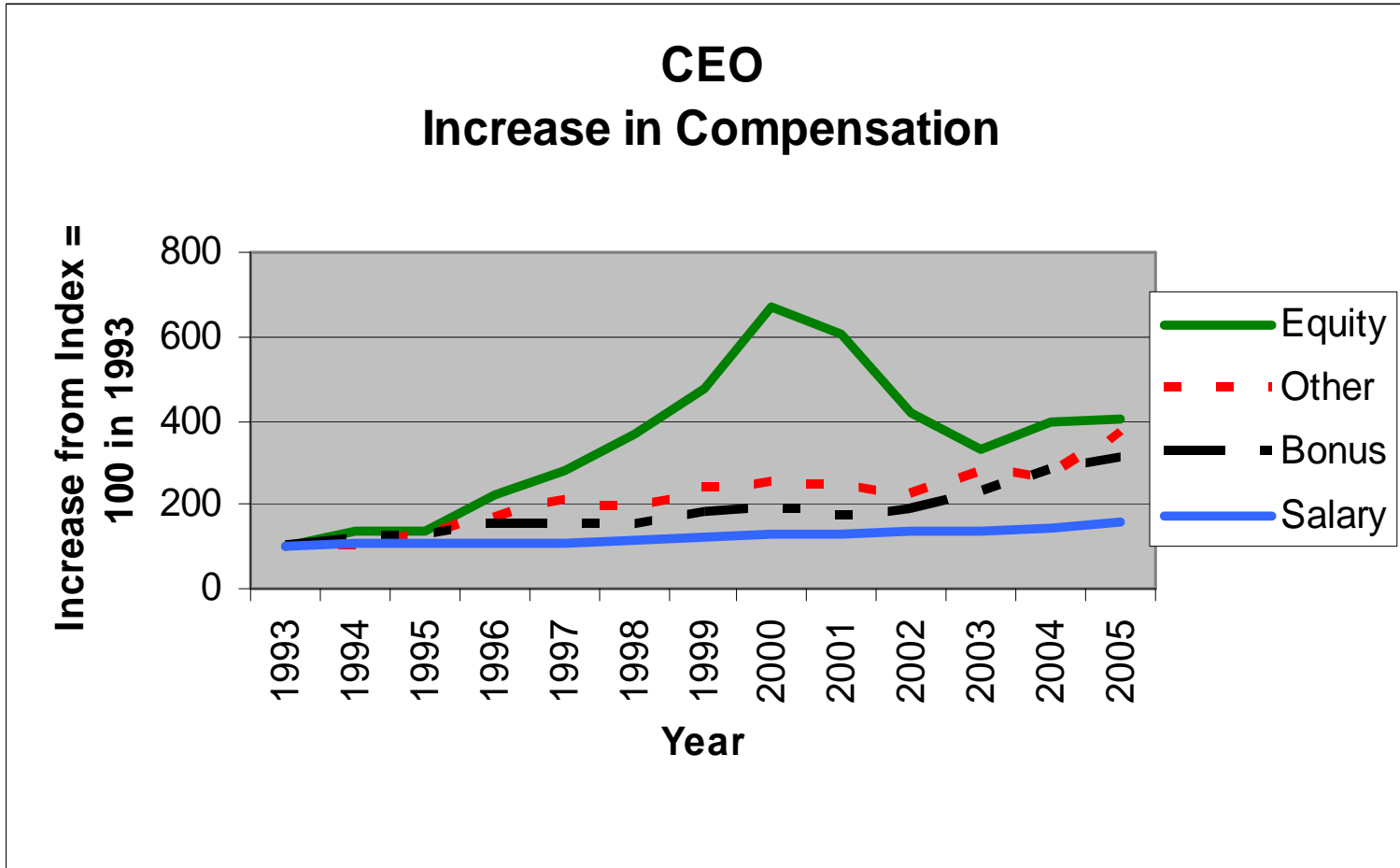


Figure 4. Increase in CEOs' Components of Mean Compensation.

Note: The CEO compensation data are from ExecuComp for the years 1993-2005. This figure presents the respective nominal increase in the index of each component of CEO mean compensation by year through 2005 from an index for each component of 100 in 1993.

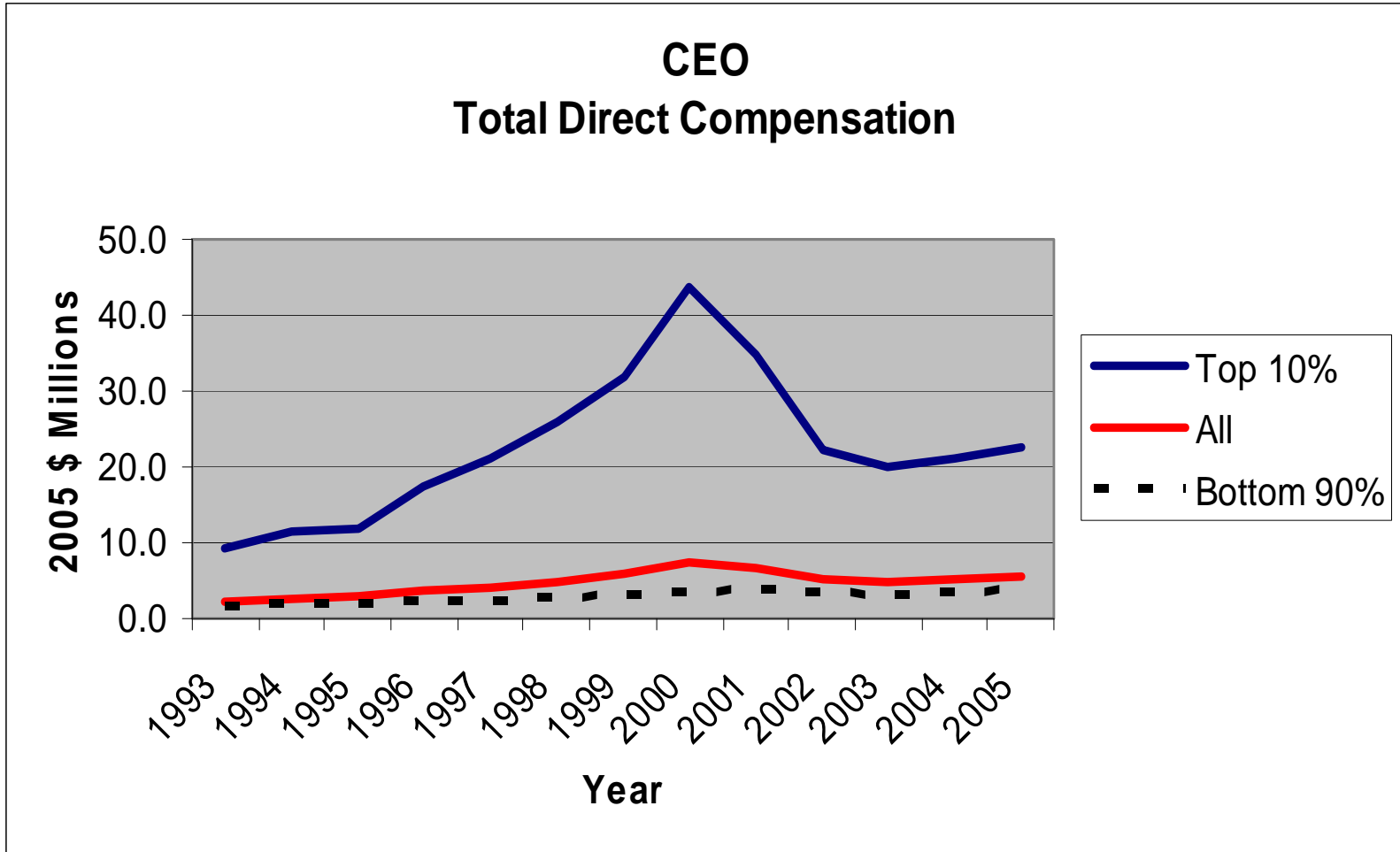


Figure 5. CEO Total Compensation by Groups Ranked by Total Compensation.

Note: The CEO compensation data are from ExecuComp for the years 1993-2005, adjusted for inflation and expressed in 2005 dollars. This figure presents the mean CEO total direct compensation adjusted for inflation, by year for three groups of CEOs: top 10% by total direct compensation, all CEOs, and bottom 90% by total direct compensation.

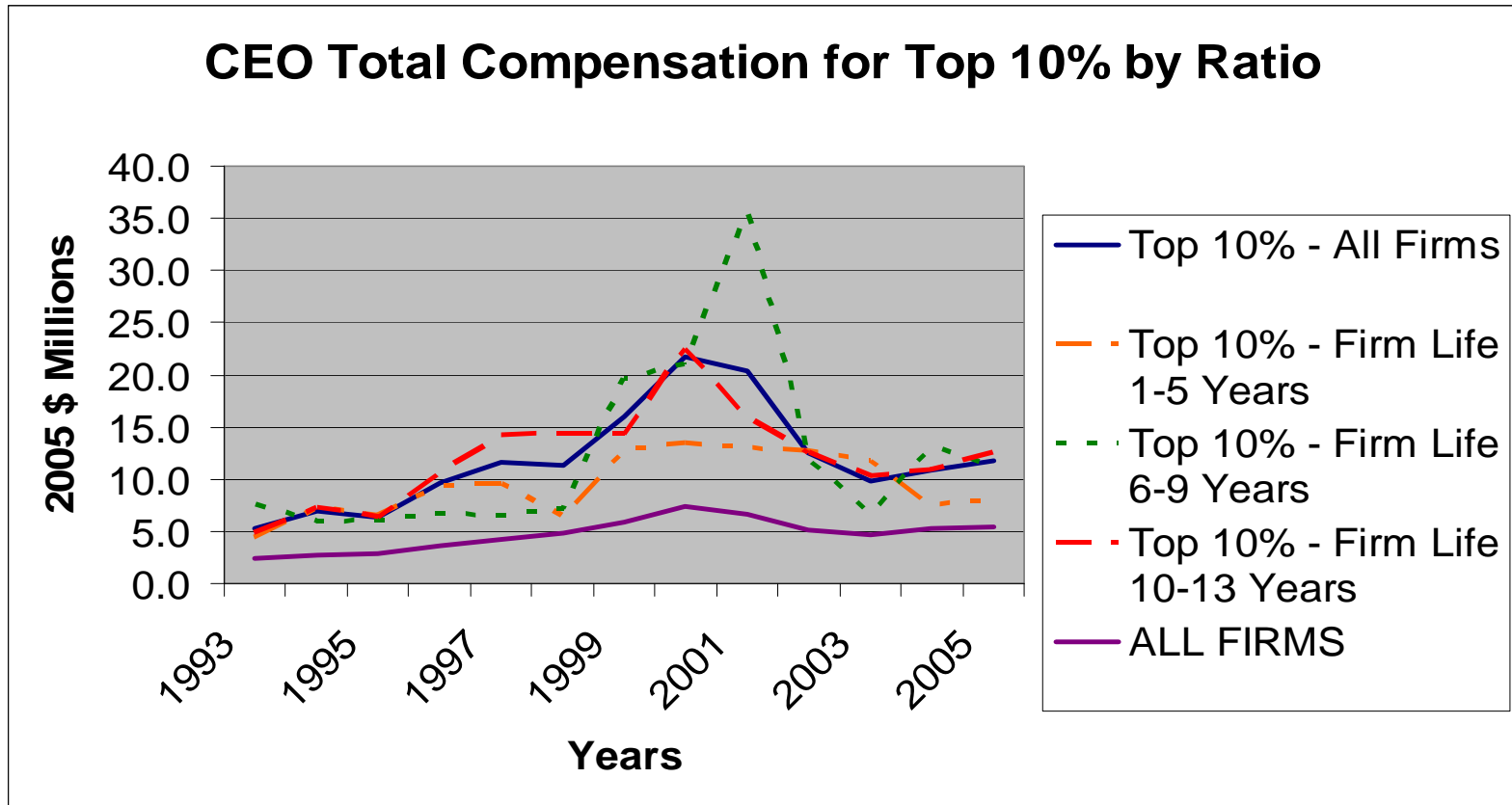


Figure 6. CEO Total Compensation by Groups of Firm Life.

Note: The CEO compensation data are from ExecuComp for the years 1993-2005, adjusted for inflation and expressed in 2005 dollars. This figure presents the mean CEO total direct compensation adjusted for inflation by year for five groups of CEOs: top 10% by total direct compensation for all firms, top 10% by total direct compensation for firms with sample life within 1 to 5 years, top 10% by total direct compensation for firms with sample life within 6 to 9 years, top 10% by total direct compensation for firms with sample life within 10 to 13 years, and all CEOs for all Firms.

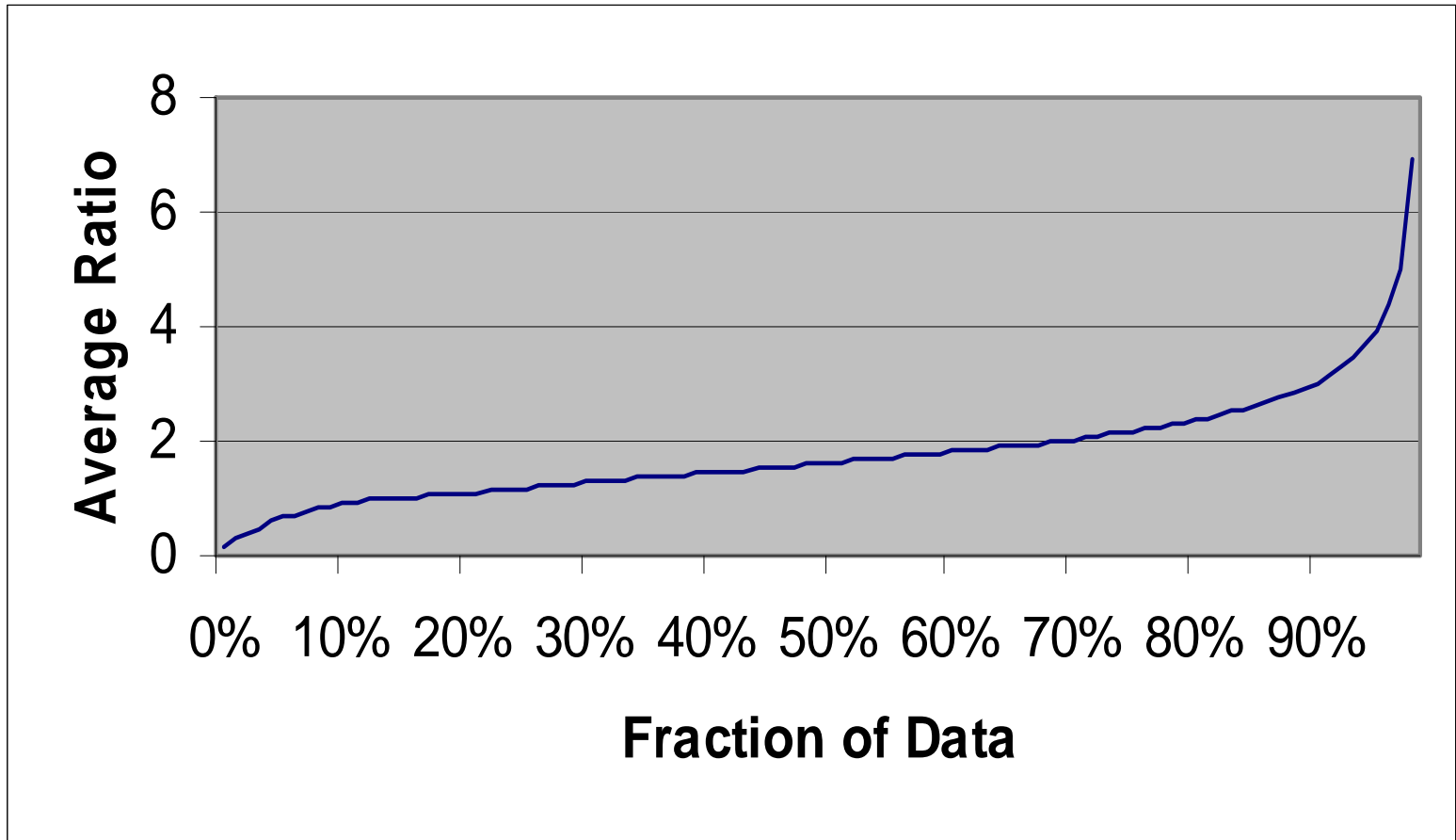


Figure 7. Plot of Average Ratio.

Note: The CEO compensation data are from ExecuComp for the years 1993-2005. The Average Ratio is the average of the annually determined ratio of CEO total direct compensation to the total direct compensation of the highest paid executive (other than the CEO) during the CEO's firm-tenure. This figure plots only the first 98% as the top 2% by Average Ratio have such large value that the scale of the figure is distorted.

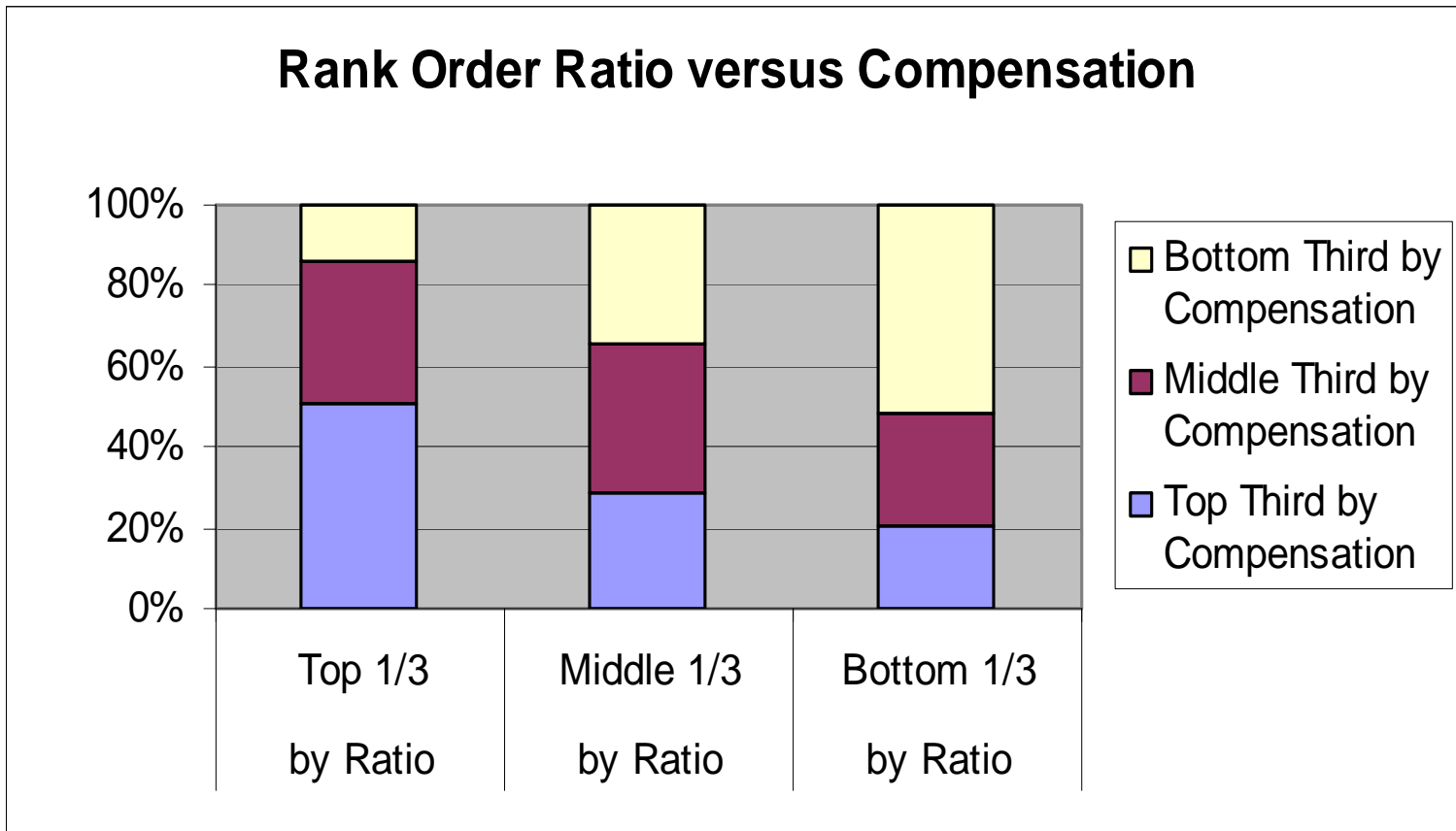


Figure 8. Rank Order of CEO Compensation and CEO/Number_2 Ratio, by thirds.

Note: The CEO compensation data are from ExecuComp for the years 1993-2005. This figure is a rank-order of CEO total direct compensation versus the CEO/Number_2 Ratio. The CEO/Number_2 Ratio is the annually determined ratio of CEO total direct compensation to the total direct compensation of the highest paid executive (other than the CEO).

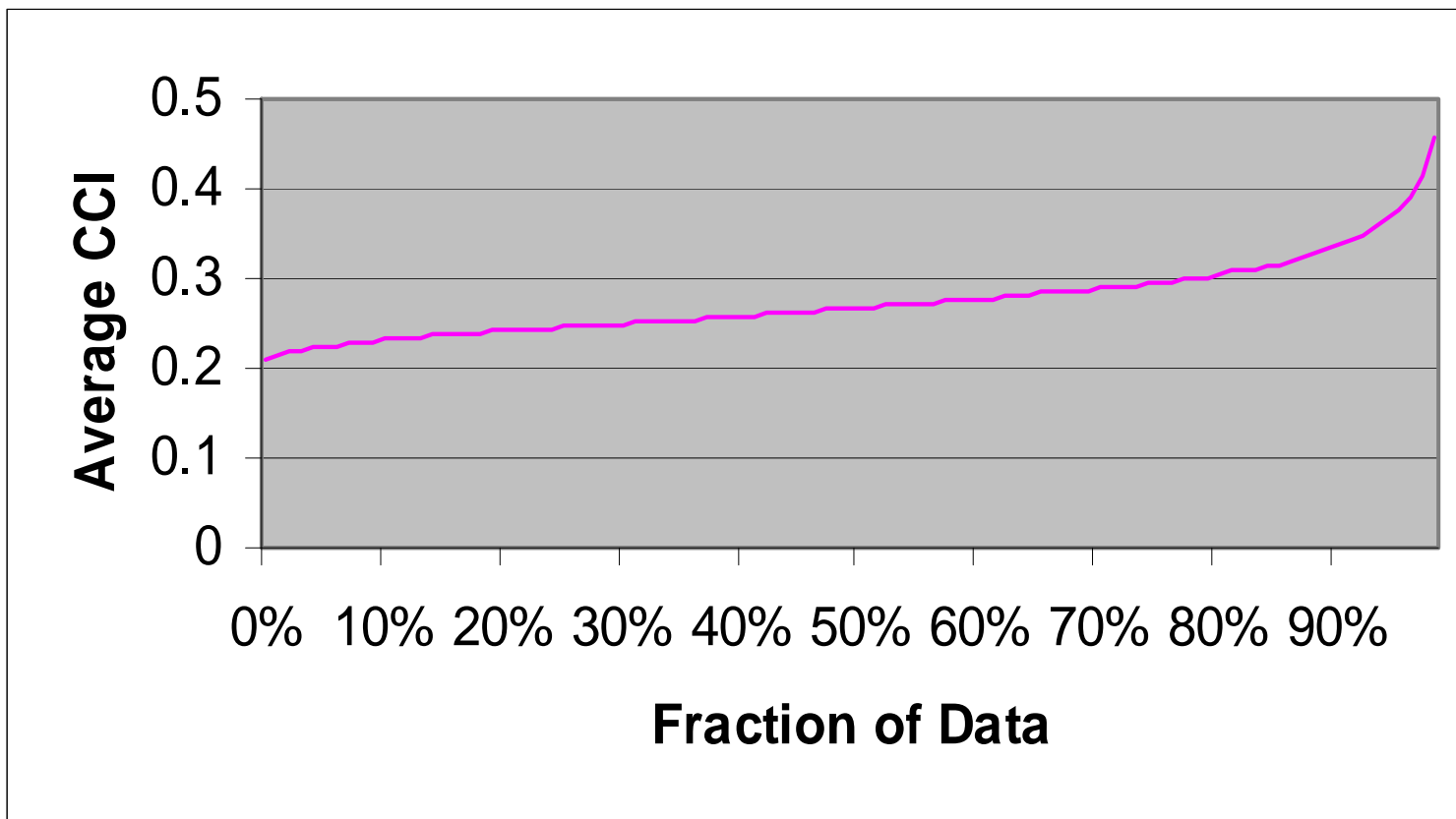


Figure 9. Plot of Average CCI.

Note: The CEO compensation data are from ExecuComp for the years 1993-2005. The Average Compensation Concentration Index (“Average CCI”) is the average of the annually determined firm compensation concentration index over the CEO’s firm-tenure. This figure plots only the first 98% as the top 2% by Average CCI distorts the scale. The compensation concentration index is the sum of squares of the top five executive’s respective share (percent) of the total compensation for the top five executives: this technique is analogous to the Herfindahl Index.

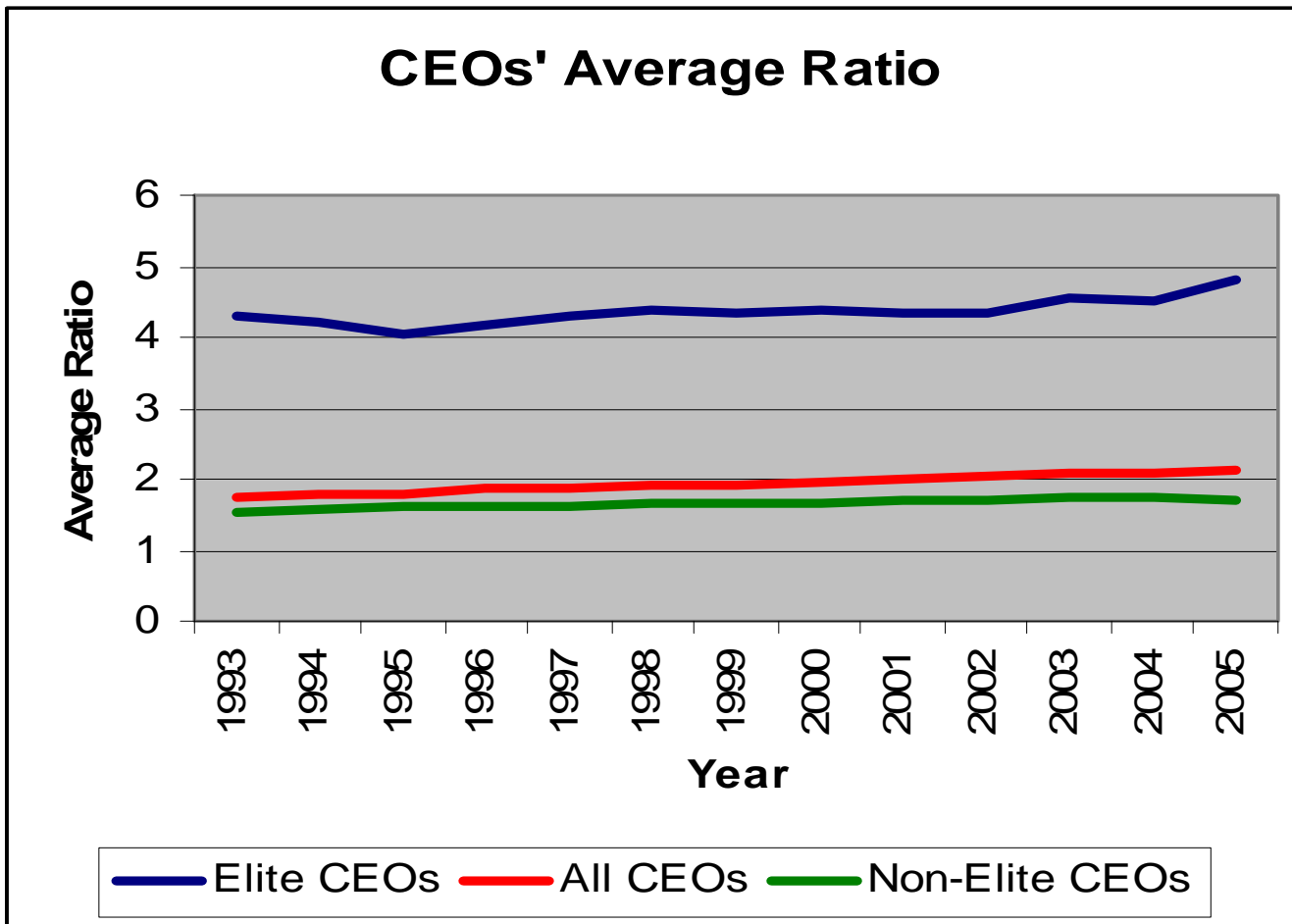


Figure 10. CEOs' Average Ratio

Note: The CEO compensation data are from ExecuComp for the years 1993-2005. The Average Ratio is the average of the annually determined ratio of CEO total direct compensation to the total direct compensation of the highest paid executive (other than the CEO) during the CEO's tenure at a given firm. Based on using the Average Ratio to rank and classify CEOs; Elite CEOs are based on a top 10% cut-off and the remaining CEOs are classified as Non-Elite CEOs.

Table 1. Summary Statistics for CEO Compensation.

Panel A. Mean CEO Compensation and S&P 500 Index.

All Firms.													
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Salary	0.64	0.65	0.65	0.64	0.64	0.65	0.67	0.68	0.70	0.70	0.71	0.72	0.74
Bonus	0.50	0.57	0.61	0.69	0.69	0.66	0.79	0.82	0.72	0.76	0.92	1.07	1.16
Equity	0.97	1.30	1.24	1.96	2.46	3.16	3.97	5.40	4.76	3.23	2.54	2.92	2.89
Other	0.24	0.25	0.29	0.37	0.46	0.40	0.50	0.52	0.48	0.43	0.52	0.50	0.67
Total	2.35	2.76	2.80	3.66	4.25	4.86	5.93	7.42	6.66	5.12	4.69	5.21	5.46
S&P 500 Index Yr-End	466	459	616	748	975	1,229	1,469	1,320	1,173	909	1,108	1,212	1,248
Firm Count	1,622	1,688	1,778	1,902	1,962	1,996	1,897	1,807	1,764	1,801	1,847	1,789	1,675
Firms in the sample each year for 1993-2005 (847 firms).													
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Salary	0.69	0.71	0.72	0.73	0.75	0.78	0.78	0.79	0.81	0.82	0.84	0.83	0.84
Bonus	0.53	0.60	0.65	0.73	0.84	0.84	0.94	1.08	0.95	0.99	1.24	1.43	1.49
Equity	0.93	1.31	1.32	2.13	2.85	4.30	3.96	6.11	4.64	3.67	3.05	3.35	3.29
Other	0.28	0.29	0.35	0.47	0.69	0.53	0.63	0.73	0.58	0.60	0.72	0.72	0.94
Total	2.43	2.93	3.03	4.06	5.12	6.46	6.30	8.72	6.98	6.07	5.85	6.33	6.56

Note: The CEO compensation data are from ExecuComp for the years 1993-2005, adjusted for inflation and expressed in 2005 dollars. Year-end S&P 500 Index levels are from Yahoo! Finance.

Panel B. Correlation Between CEO Total Direct Compensation and CEO/Number_2 Ratio.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Overall
Pair-wise	0.34	0.42	0.42	0.21	0.31	0.12	0.27	0.29	0.35	0.40	0.47	0.35	0.35	0.24
Spearman's	0.34	0.40	0.35	0.36	0.37	0.38	0.43	0.42	0.44	0.46	0.45	0.44	0.43	0.42

Note: The CEO compensation data are from ExecuComp for the years 1993-2005. This table presents the pair-wise correlation and the Spearman correlation between CEO total direct compensation and the CEO/Number_2 Ratio. The CEO/Number_2 Ratio is the annually determined ratio of CEO total direct compensation to the total direct compensation of the highest paid executive (other than the CEO).

Table 2. Key Extant Research.

Authors (Year Published)	Main model(s)	Main Findings
Bebchuk & Grinstein 2005	1) Executive comp. regressions 2) Predicted 2003 comp. based on 1993 model	1) Controlling for firm size, performance and industry classification they find that compensation increased far beyond what can be attributed to their control variables. 2) Find that actual 2003 compensation levels were much higher than was predicted based on the relation of compensation to firm size, performance and industry classification in 1993.
Brick, Palmon, Wald 2006	1) Director compensation regressions 2) CEO compensation regressions 3) Summary statistics on extreme director comp. 4) 1-year excess returns regressions	1) Find director compensation is directly related to the need for firm monitoring. 2) Find a significant positive relation between CEO compensation and excess director compensation after controlling for other variables. 3) Conclude that excess CEO and director compensation is associated with poor firm governance. 4) Results are consistent with their cronyism hypothesis.
Daines, Nair, Kornhauser 2005	1) Firm performance regressions (all firms) 2) Segregate by small and large firms 3) Segregate by high and low environmental constraints	1) Find highly paid CEOs are significantly more likely to lead firms that have persistently good performance. However, find no evidence that highly paid CEOs turnaround poor firm performance. 2) Finds small firms with highly paid CEOs are significantly more likely to continue good performance and to reverse poor performance than poorly paid CEOs. However, in large firms there is no evidence that highly paid CEOs produce predictably better results than poorly paid CEOs. 3) Finds firms with low constraints and highly paid CEOs are significantly more likely to continue good performance and to reverse poor performance than poorly paid CEOs. However, in firms with high constraints there is little evidence that highly paid CEOs produce predictably better results than poorly paid CEOs.
Hayward & Hambrick 1997	1) Acquisition premium regression 2) Post-acquisition CAR regression	1) The four indicators of CEO hubris are highly correlated with the size of the acquisition premium. 2) Found losses in acquiring firms' shareholder wealth following an acquisition. Also found that the greater the CEO hubris and acquisition premium, the greater the loss.

(Continued on next page)

Table 2 continued.

Authors (Year Published)	Main model(s)	Main Findings
Malmendier & Tate 2005	1) Logit regression 2) Event study around award date 3) ROA regressions 4) total and cash compensation regressions	1) CEO award winners are more likely to have more company ownership, higher compensation, longer tenure and to be female. The firms are typically larger, have lower book-to-market ratio, higher sales, and higher returns over the past year. 2) Find negative cumulative abnormal performance, using stock return data, over a 1, 2, or 3 year interval following the award. 3) Find over the three years following an award, the ROA is roughly two and a quarter percentage points lower than in the year preceding and year of the CEO award. Also, a matched sample of 'predicted winners' did not experience the same decline in performance. 4) Find award winners obtain significantly higher total compensation (tdc1) in the year following the award. Generally, this takes the form of increases in equity-based compensation and is greatest among powerful CEOs (also Chairman and President) and in weakly governed firms.
Milbourn 2005	1) CEO pay sensitivity regressions	1) Finds stock based pay sensitivities are strictly increasing in a CEO's reputation.
Wade, Porac, Pollock, and Graffin 2006	1) Event Study 2) Firm performance regressions 3) CEO compensation regressions	1) They performed an event study around the announcement date of the CEO of the year Award and found the immediate effect of winning a medal is positive, over time the effect is negative. 2) Using a fixed-effects regression analysis they found that although the market had an initially positive reaction to CEO certification, over the long term there is a negative relationship between CEO certification and market performance, and no relationship between CEO certification and accounting performance in the following year. 3) Found that certified CEOs received higher compensation than non-certified CEOs when performance was high but lower remuneration when performance was poor.

Table 3. CEO Compensation Regressions, Variables and Descriptions.

Variable name	Variable description and comments²⁰
Dependent Variables	
<i>CEO Compensation variables</i>	
Salary	Ln of CEOs salary. ExecuComp.
Bonus	Ln of CEOs bonus. ExecuComp.
Equity-based compensation	Ln of (CEOs restricted stock grants plus stock options). RSTKGRNT + OPTION_1 from ExecuComp.
Other compensation	Ln of (Total direct compensation – salary – bonus – equity-based comp.).
Total direct compensation	Ln of CEOs total of salary, bonus, the total value of restricted stock granted, total value of stock options granted using Black-Scholes model, long term incentive payouts, and all other payments. TDC1 from ExecuComp.
Independent Variables	
<i>Firm performance variables²¹</i>	
Return on assets	Net income before extraordinary items over assets, in the year prior to the year of observation. Proxy for CEO skill and helps explain annual bonus. ROA from ExecuComp.
Net Income 3 yr growth rate	3-year growth rate in net income using least squares methodology, in the year prior to the year of observation. Proxy for CEO skill and helps explain long term incentive plan bonus. NI3LS from ExecuComp.
Shareholder 3-year return	3-year shareholder return with dividends reinvested, in the year prior to the year of observation. Proxy for CEO skill and helps explain equity-based compensation. Winsorized at the 99 th percentile to remove influential outliers. TRS3YR from ExecuComp.

(Continued on next page)

²⁰ The listed variable name is the same as the source's name for the variable unless otherwise noted.

²¹ I use past firm performance as a proxy for CEO skill. Certainly some could make the argument that this over-attribution. Regardless, these variables explain components of CEO compensation.

Table 3 continued

Variable name	Variable description and comments²⁰
<i>Firm characteristics</i>	
Firm size	The ln of sales, in the year prior to the observation. Explains firm scale and complexity. SALES from ExecuComp.
Stock volatility	The Black-Scholes stock volatility measure, in the year prior to the observation. Explains firm complexity. BS_VOLATILITY from ExecuComp.
Total liabilities/assets	The ratio of total liabilities to total assets, in the year prior to the observation. Explains firm complexity. DATA181/DATA6 from Compustat.
PP&E/assets	The ratio of a firm's net property, plant, and equipment to total assets, in the year prior to the observation. Explains firm complexity. DATA8/DATA6 from Compustat.
R&D/assets	The ratio of the firm's research and development expenditures to total assets, in the year prior to the observation. Explains firm complexity. Missing values are replaced by zeros. DATA45/DATA6 from Compustat.
Market to Book ratio	The ratio of market value of assets to the book value of assets, in the year prior to the observation. The market value of assets is the market value of equity (CRSP year price (DATA24) times common shares outstanding (DATA25)) plus book assets (DATA6) minus book equity (DATA60) minus deferred taxes (DATA74). The book value of assets is DATA6. Compustat.
<i>CEO characteristics</i>	
CEO age	The age of the CEO, in the year prior to the observation. AGE from ExecuComp.
CEO age ²	The age of the CEO squared, in the year prior to the observation.
CEO tenure	The years of service as the CEO at the firm, in the year prior to the observation. Determined from data in ExecuComp.
<i>Governance characteristics</i>	
Governance Index	The Gompers, Ishii, Metrick governance index. Variable gindex from The Investor Responsibility Research Center.
<i>Control variables</i>	
Industry dummies	Industry group codes. SPINDEX from ExecuComp.
Year dummies	Year of the observation. ExecuComp.

Note: This table lists and describes the variables I use in the regressions with CEO compensation as the dependent variable. I also note the source of the data for each variable and the source's name or code for the listed variable.

Table 4. CEO Compensation Regressions, Key Extant Research.

	Malmendier and Tate 2005	Malmendier and Tate 2005	Brick et al²² 2006	Bebchuk and Grinstein 2005	Milbourn 2003	Cyert, Kang, Kumar 2002
CEO Sample	CEO award winners ²³	Matched sample of CEOs ²⁴	All CEOs	All CEOs	All CEOs	All CEOs
Dependent Variable						
Log of CEO compensation	Various time periods ²⁵	Various time periods ²³	Yes ²³	Yes ²⁶		Yes ²⁷
CEO pay sensitivity					Yes	
Independent Variables						
<i>Firm characteristics</i>						
Firm size (log of sales)	Not Significant	Mixed Significance				
Firm size (log of sales _{t-1})			Positive	Positive		
Firm size (market equity)					Negative	
Firm size (log of net assets)						Positive, Mixed Significance
Stock Return						Positive, Mixed Significance
Return on Equity						Mixed Sign, Mixed Significance
ROA	Mixed Significance	Positive				
Q _{t-1}			Positive			
ROA _{t-1}			Not Significant			

(Continued on next page)

²² Brick, Palmon and Wald 2006

²³ Regressions with only CEO award winners.

²⁴ Regressions comparing 'actual' CEO award winners to 'predicted' CEO award winners (i.e., matched sample).

²⁵ Ran regressions with both total and cash compensation.

²⁶ Ran regressions with total, equity and non-equity compensation.

²⁷ Three regressions: base salary, equity compensation, and discretionary compensation.

Table 4 continued.

	Malmendier and Tate 2005	Malmendier and Tate 2005	Brick et al 2006	Bebchuk and Grinstein 2005	Milbourn 2003	Cyert, Kang, Kumar 2002
Mean ROA _{t-1, t-3}			Not Significant			
Stock return _{t-1, t-3}			Positive			
Cash flow risk			Mixed Significance			
Stock volatility			Mixed Significance			Positive
Log (employees _{t-1})			Positive			
R&D _{t-1} /assets _{t-1}			Mixed Significance			
Advertising _{t-1} /assets _{t-1}			Mixed Significance			
Debt _{t-1} /assets _{t-1}			Mixed Significance			
PP&E _{t-1} /assets _{t-1}			Negative			
Investments _{t-1} /assets _{t-1}			Mixed Significance			
Log(1+Firm ROA _{t-1})				Positive		
Log(1+Firm Return _{t-1})				Positive		
Log(1+Firm Return _{t-2})				Positive ²⁸		
Default Risk						Negative
Financial Leverage						Mixed Sign, Mixed Significance
Growth opportunities						Mixed Sign, Mixed Significance

(Continued on next page)

²⁸ Statistical Significance depends on level of compensation used in regression.

Table 4 continued.

	Malmendier and Tate 2005	Malmendier and Tate 2005	Brick et al 2006	Bebchuk and Grinstein 2005	Milbourn 2003	Cyert, Kang, Kumar 2002
<i>CEO characteristics</i>						
CEO age	Not Significant	Not Significant			Negative	Mixed Sign, Mixed Significance
CEO gender			Mixed Significance			
CEO stock ownership [%]			Negative			Positive
CEO is chairman			Mixed Significance			Positive
Internal CEO			Negative			
<i>CEO reputation (Milbourn)</i>						
CEO tenure (experience)	Not Significant	Not Significant	Mixed Significance		Positive	Mixed Sign
Dow Jones Hits					Positive	
Outsider					Positive	
Industry adj. firm performance					Positive ²⁹	
<i>Board characteristics</i>						
Number of board meetings			Mixed Significance			
Excess director total comp.			Positive			
Proportion of outside directors						Positive, Mixed Significance
Board Size						Mixed Sign, Mixed Significance

(Continued on next page)

²⁹ Industry adjusted stock price performance for 1 year, 3 years, or 5 years prior with current CEO at the helm. Used only one of these in a given model.

Table 4 continued.

	Malmendier and Tate 2005	Malmendier and Tate 2005	Brick et al 2006	Bebchuk and Grinstein 2005	Milbourn 2003	Cyert, Kang, Kumar 2002
<i>Ownership Characteristics</i>						
Largest stock ownership, non-CEO [%]						Negative, Mixed Significance
Largest stock ownership, CEO [%]						Negative, Mixed Significance
Compensation committee ownership [%]						Negative
Internal Blockholder > 5%						Not Significant
External Blockholder > 5%						Positive, Mixed Significance
<i>Other independent variables</i>						
1 year after award	Positive	Not Significant				
2 years after award	Positive	Not Significant				
3 years after award	Positive	Not Significant				
Firm fixed-effects	Included	Included		Included		
Year fixed-effects	Included	Included	Included	Positive ³⁰	Included	
SIC (industry) dummies			Included		Included	
Regulated industry						Negative, Mixed Significance
<i>Data</i>						
Time period	1992-2002	1992-2002	1992-2001	1993-2003	1993-1998	1992-1993
Number of CEOs	594-760 ³¹	633-805	1,435 firms	1,500 firms	1,500 firms	1,648 firms

Note: This table lists the variables and presents the sign and significance of the results of prior research that performed regressions with some component of CEO compensation as the dependent variable.

³⁰ Positive and statistically Significant for each year 1994 through 2003.

³¹ Without CEO age variable.

Table 5. Firm Performance Regressions, Variables and Descriptions.

Variable name	Variable description and comments ³²
Dependent Variables	
<i>Firm performance variables</i>	
Return on assets	Net income before extraordinary items over total assets, in the year after the observation. ROA from ExecuComp.
Return on equity	Return on equity, in the year after the observation. ROEPER from ExecuComp.
Shareholder 1-year return	1-year return shareholders with dividends reinvested, 1-year after the year of the observation. Winsorized at the 99 th percentile to remove influential outliers. TRS3YR from ExecuComp.
Shareholder 3-year return	3-year return shareholders with dividends reinvested, 3 years after the year of the observation. Winsorized at the 99 th percentile to remove influential outliers. TRS3YR from ExecuComp.
Shareholder 5-year return	5-year return shareholders with dividends reinvested, 5 years after the year of the observation. Winsorized at the 99 th percentile to remove influential outliers. TRS5YR from ExecuComp.
Net Income 3 yr growth rate	3-year growth rate in net income using least squares methodology, 3 years after the year of the observation. NI3LS from ExecuComp.
Net Income 5 yr growth rate	5-year growth rate in net income using least squares methodology, 5 years after the year of the observation. NI3LS from ExecuComp.
Market to Book ratio	The ratio of market value of assets to the book value of assets. The market value of assets is the market value of equity (CRSP year price (DATA24) times common shares outstanding (DATA25)) plus book assets (DATA6) minus book equity (DATA60) minus deferred taxes (DATA74). The book value of assets is DATA6. Compustat.

(Continued on next page)

³² The listed variable name is the same as the source's name of the variable unless otherwise noted.

Table 5 continued.

Variable name	Variable description and comments
Independent Variables	
<i>Firm characteristics</i>	
Firm size	The ln of sales. Explains firm scale and complexity. SALES from ExecuComp.
Stock volatility	The Black-Scholes stock volatility measure. Explains firm complexity. BS_VOLATILITY from ExecuComp.
Total liabilities/assets	The ratio of total liabilities to total assets. Explains firm complexity. DATA181/DATA6 from Compustat.
PP&E/assets	The ratio of a firm's net property, plant, and equipment to total assets. Explains firm complexity. DATA8/DATA6 from Compustat.
R&D/assets	The ratio of the firm's research and development expenditures to total assets. Explains firm complexity. Missing values are replaced by zeros. DATA45/DATA6 from Compustat.
Market to Book ratio	The ratio of market value of assets to the book value of assets. The market value of assets is the market value of equity (CRSP year price (DATA24) times common shares outstanding (DATA25)) plus book assets (DATA6) minus book equity (DATA60) minus deferred taxes (DATA74). The book value of assets is DATA6. Compustat.
Net income/assets	The ratio of firm net income to total assets. Net income (after extraordinary and discontinued operations) from ExecuComp/DATA6 from Compustat. This independent variable replaces market to book ratio as an independent variable for the regression with market to book ratio as a dependent variable.
Variable name	Variable description and comments
<i>CEO Compensation variables</i>	
Salary	Ln of CEOs salary. ExecuComp.
Bonus	Ln of CEOs bonus. ExecuComp.
Equity-based compensation	Ln of CEOs restricted stock grants plus stock options. RSTKGRNT + OPTION_1 from ExecuComp. Except use STOCK_AW + OPTION_A for some in 2006 (SEC reported values).
Other compensation	Ln of (Total direct compensation – salary – bonus – equity-based comp.).
<i>CEO characteristics</i>	
CEO age	The age of the CEO in the year of the observation. AGE from ExecuComp.
CEO age ²	The age of the CEO squared, in the year prior to the observation.
CEO tenure	The years of service as the CEO at the firm, in the year prior to the observation. Determined from data in ExecuComp.

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Table 5 continued.

Variable name	Variable description and comments
<i>Governance characteristics</i>	
Governance Index	The Gompers, Ishii, Metrick governance index. Variable gindex from The Investor Responsibility Research Center.
<i>Control variables</i>	
Industry dummies	Industry group codes. SPINDEX from ExecuComp.
Year dummies	Year of the observation. ExecuComp.

Note: This table lists and describes the variables I use in the regressions with firm performance as the dependent variable. I also note the source of the data for each variable and the source's name or code for the listed variable.

Table 6. Firm Performance Regressions, Key Extant Research.

	Mehran 1995	Malmendier and Tate 2005	Malmendier and Tate 2005	Brick et al ³³ 2006	Daines et al ³⁴ 2005
CEO Sample		CEO award winners ⁹	Matched sample ¹⁰	All CEOs	All CEOs
Dependent Variable					
Tobin's Q	Included				
Return on Assets	Included	Various time periods	Various time periods		Included
1-year excess returns				Included ³⁵	Included ³⁶
Independent Variables					
<i>Firm characteristics</i>					
Firm size (log of tot assets)	Negative				
Firm size (log of sales)		Negative	Mixed significance		
Firm size (log of sales _{t-1})				Not reported	
R&D/Sales	Positive				
(Inv+PP&E)/total assets	Not significant				
LT debt/ total assets	Not significant				
Q _{t-1}				Not reported	
ROA _{t-1}		Positive	Positive	Not reported	
Mean ROA _{t-1, t-3}				Not reported	
Stock return _{t-1, t-3}				Not reported	
Cash flow risk				Not reported	
Stock volatility				Not reported	
Log (employees _{t-1})				Not reported	

(Continued on next page)

³³ Brick, Palmon and Wald 2006

³⁴ Daines, Nair and Kornhauser 2005

³⁵ One-factor model and Fama-French three-factor model.

³⁶ Fama-French four-factor model.

Table 6 continued.

	Mehran 1995	Malmendier and Tate 2005	Malmendier and Tate 2005	Brick et al 2006	Daines et al 2005
<i>Firm characteristics</i>					
<i>(continued)</i>					
R&D _{t-1} /assets _{t-1}				Not reported	
Advertising _{t-1} /assets _{t-1}				Not reported	
Debt _{t-1} /assets _{t-1}				Not reported	
PP&E _{t-1} /assets _{t-1}				Not reported	
Investments _{t-1} /assets _{t-1}				Not reported	
<i>CEO characteristics</i>					
CEO tenure (experience)				Not reported	
CEO gender				Not reported	
CEO's equity-based comp [% of total comp]	Positive				
% equity owned by CEO	Positive			Mixed significance	
CEO is chairman				Not significant	
Internal CEO				Mixed significance	
Log (CEO's total comp.)				Negative ³⁷	
<i>Board characteristics</i>					
% shares held by outside directors	Not significant				
Outside directors [% of board]	Not significant				
Number of board meetings				Not significant	
Excess director total comp.				Positive	
Log (director's total comp.)				Negative	

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³⁷ Mixed significance depending upon which model is used (pooled versus fixed-effects, one-factor versus Fama-French three-factor model).

Table 6 continued.

	Mehran 1995	Malmendier and Tate 2005	Malmendier and Tate 2005	Brick et al 2006	Daines et al 2005
<i>Other independent variables</i>					
1 year after award		Negative	Not significant		
2 years after award		Negative	Not significant		
3 years after award		Negative	Not significant		
Firm fixed-effects		Included	Included		
Year fixed-effects		Included	Included	Included	
SIC (industry) dummies				Included	
Prior good performance for highly paid CEOs					Mixed significance ³⁸
Prior bad performance for highly paid CEOs					Mixed significance
Highly paid CEO dummy					Mixed significance
Prior good performance					Mixed significance
Prior bad performance					Mixed significance
<i>Data</i>					
Time period	1979-1980	1992-2002	1992-2002	1992-2001	1992-2001
Number of firms	153	608-775	641-814	1193-1336	2,284

Note: This table lists the variables and presents the sign and significance of the results of prior research that performed regressions with some measure of firm performance as the dependent variable.

³⁸ Mixed significance depending upon how they broke out the regressions: i.e., by firm size, by management constraints, by level of incentive pay, and by whether or not there is a 5% blockholder.

Table 7. Data and Sources in Key Extant Research.

Authors (Year Published)	Data	Sources	Period	Sample
Bebchuk & Grinstein 2005	Executive compensation. Firm acctg and market characteristics.	ExecuComp. Compustat.	1993-2003.	1,500 firms (S&P500, Mid400, Small600)
Brick, Palmon, & Wald 2006	Executive and director compensation. Firm acctg and market characteristics. Governance characteristics. Governance characteristics.	ExecuComp. Compustat.	1992-2001.	1163 to 1441 firms (varies). Sub-sample of 237 firms.
		Directory of Corporate Executives and Directors. Proxy statements.	1997. 1992-2001.	
Core, Holthausen & Larcker 1999	Executive compensation. Firm variables. Board and ownership variables.	Compensation consultant. Compustat. Proxy statements.	1982-1984.	205 publicly traded firms.
Daines, Nair, & Kornhauser 2005	CEO compensation and characteristics. Firm characteristics and performance.	ExecuComp. Compustat and CRSP.	1992-2001.	2,284 firms and 2,880 CEOs.
Hall & Liebman 1998	CEO compensation.	Proxy statements and 10-K filings. CRSP. Compustat.	1980-1994.	478 firms.
	Stock price and returns. Accounting information.			
Hayward & Hambrick 1997	Acquisitions > \$100 million. Media praise for the CEO.	Securities Data Corporation's Mergers and Acquisitions database. Seven major newspapers.	1989 and 1992.	106 transactions.
Jensen & Murphy 1990a	CEO compensation. Firm characteristics and performance.	Forbes' Executive Comp Survey and proxies. Compustat and CRSP.	1969-1983.	73 manufacturing firms.

(Continued on next page)

Table 7 continued.

Authors (Year Published)	Data	Sources	Period	Sample
Malmendier & Tate 2005	CEO Awards. CEO compensation and characteristics. Firm characteristics and performance.	Hand-collected from various journals. ExecuComp. Compustat and CRSP.	1975-2002. 1992-2002. 1975-2002.	283 awards. 1,500 firms (S&P500, Mid400, Small600)
Mehran 1995	CEO compensation, firm and board characteristics.	Compustat Annual Industrial File.	1979-1980	153 manufacturing firms.
Milbourn 2005	CEO compensation and characteristics. Stock data. Dow Jones News Retrieval Service.	ExecuComp. CRSP. Number of articles with CEO's name.	1993-1998.	1,500 firms (S&P500, Mid400, Small600)
Wade, Porac, Pollock, & Graffin 2006	CEO of the Year Award CEO compensation and characteristics. Firm characteristics and performance.	Financial World. ExecuComp. Compustat.	1975-1996. 1992-1996.	278 firms from the S&P 500.

Note: The data and sources used in prior research that I consider key to my dissertation.

Table 8. Summary Statistics.

Variable	N	Min	Max	Median	Mean	s.d.
CEO Compensation Variables						
Salary [\$ Thousands]	23,528	0	8,320	526	591	345
Bonus[\$ Thousands]	23,528	0	43,512	320	672	1,327
Equity [\$ Thousands]	23,528	0	650,812	652	2,525	9,874
Other [\$ Thousands]	23,528	0	96,423	41	386	1,712
Total Compensation [\$Thousands]	23,528	0	655,448	1,900	4,173	10,606
CEO Characteristics						
CEO Age [Years]	23,528	28	91	55	55	7.6
CEO Age Squared	23,528	784	8,281	3,025	3,127	856.0
CEO Firm-Tenure [Years]	23,528	1.0	55.0	4.0	6.4	6.4
Average Ratio	23,528	0.0	60.3	1.72	1.94	1.42
Average CCI	23,143	0.2	0.65	0.27	0.27	0.05
Firm Performance Variables						
ROA [%]	23,527	-588	1,100	4.1	3.3	17.6
ROE [%]	22,916	-33,719	5,277	12.7	6.9	248.5
NI 3-Year Growth Rate [%]	15,667	-93	28,527	15.5	27.4	236.8
NI 5-Year Growth Rate [%]	13,802	-68	1,843	14.2	21.1	43.4
Shareholder 1-Year Return [%]	23,528	-99	567	12.5	21.0	60.6
Shareholder 3-Year Return [%]	23,528	-94	169	12.0	14.1	28.6
Shareholder 5-Year Return [%]	23,528	-84	97	11.7	12.2	19.9
Market Value/Book Value	23,286	0.22	246.47	1.47	2.09	2.77
Firm Characteristics						
Sales [\$Millions]	23,528	19	328,213	973	3,934	11,632
BS Volatility	23,505	0.10	4.21	0.37	0.44	0.26
Net Income/Assets	23,527	-5.88	11.0	0.04	0.03	0.18
Liabilities/Assets	23,476	0.02	4.22	0.57	0.57	0.25
PPE/Assets	23,133	0.00	0.97	0.23	0.29	0.24
RD/Assets	23,527	0.00	0.96	0.00	0.01	0.04
Governance Index	23,528	1.0	18.5	9.0	9.0	2.6

Note: Summary statistics for the data set described in Section 5.

Table 9. Pair-wise Correlations.

	Variable	1	2	3	4	5												
1	Salary [\$M]	1.00																
2	Bonus[\$M]	0.42	1.00															
3	Equity [\$M]	0.16	0.19	1.00														
4	Other [\$M]	0.21	0.23	0.07	1.00													
5	Total Comp. [\$M]	0.26	0.36	0.97	0.26	1.00												
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
6	CEO Age [Years]	1.00																
7	CEO Age Squared	0.99	1.00															
8	CEO Firm-Tenure [Years]	0.28	0.29	1.00														
9	ROA [%]	0.05	0.05	0.07	1.00													
10	ROE [%]	0.01	0.01	0.02	0.18	1.00												
11	NI 3-Year Growth Rate [%]	(0.02)	(0.02)	(0.00)	0.05	0.01	1.00											
12	NI 5-Year Growth Rate [%]	(0.12)	(0.11)	(0.03)	0.19	0.07	0.75	1.00										
13	Shareholder 1-Year Return [%]	(0.01)	(0.01)	(0.04)	(0.00)	0.00	(0.01)	(0.02)	1.00									
14	Shareholder 3-Year Return [%]	(0.00)	(0.00)	(0.01)	0.04	(0.00)	0.01	0.01	0.68	1.00								
15	Shareholder 5-Year Return [%]	(0.00)	(0.00)	0.03	0.03	0.00	0.01	0.05	0.45	0.75	1.00							
16	Sales [\$MM]	0.06	0.05	(0.00)	0.02	0.01	(0.01)	(0.04)	0.01	0.01	(0.00)	1.00						
17	BS Volatility	(0.19)	(0.18)	(0.17)	(0.17)	(0.06)	0.05	0.23	0.08	(0.02)	(0.08)	(0.13)	1.00					
18	Liabilities/Assets	0.07	0.06	(0.05)	(0.17)	(0.05)	(0.04)	(0.13)	0.01	0.00	0.00	0.15	(0.15)	1.00				
19	PPE/Assets	0.06	0.06	0.07	0.02	(0.00)	(0.01)	(0.11)	(0.03)	(0.01)	0.01	0.02	(0.16)	0.02	1.00			
20	RD/Assets	(0.04)	(0.03)	0.01	0.01	0.01	(0.01)	(0.01)	0.01	0.02	0.01	0.01	0.03	(0.04)	(0.02)	1.00		
21	Market Value to Book Value	(0.10)	(0.09)	(0.03)	0.09	0.01	0.04	0.22	0.08	0.08	0.07	(0.03)	0.14	(0.21)	(0.10)	0.06	1.00	
22	Governance Index	0.04	0.03	(0.03)	(0.00)	0.01	(0.02)	(0.11)	(0.01)	(0.01)	(0.03)	(0.01)	(0.16)	0.17	0.05	(0.02)	(0.09)	1.00

Note: Pair-wise correlations for the data set described in Section 5.

Table 10. Firm Life.

Panel A

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
(1) Firm Count	1,622	1,688	1,778	1,902	1,962	1,996	1,897	1,807	1,764	1,801	1,847	1,789	1,675
(2) Count survived from previous year		1,589	1,620	1,711	1,762	1,844	1,846	1,742	1,689	1,717	1,753	1,777	1,671
(3) % survived from previous year		98.0%	96.0%	96.2%	92.6%	94.0%	92.5%	91.8%	93.5%	97.3%	97.3%	96.2%	93.4%
(4) Count survived from 1993		1,589	1,522	1,464	1,340	1,246	1,145	1,053	989	970	949	920	867
(5) % survived from 1993		98.0%	93.8%	90.3%	82.6%	76.8%	70.6%	64.9%	61.0%	59.8%	58.5%	56.7%	53.5%

Note: Rows (2) and (3) show the count and percent, respectively, of firms that survive from one year to the next. Rows (4) and (5) show the count and percent, respectively, of firms that are in the sample in 1993 that survive throughout the sample period. Note that slightly more than half of the firms that are in the sample in 1993 are still in the sample in 2005 (i.e., 867 out of 1,622 firms). However, 20 of the 867 firms are not in the sample for all 13 years.

Panel B

(1) Life - N years	1	2	3	4	5	6	7	8	9	10	11	12	13
(2) Firms w/ N yr life	42	83	215	252	201	185	162	197	160	151	131	120	847
(3) % of Total	1.5%	3.0%	7.8%	9.2%	7.3%	6.7%	5.9%	7.2%	5.8%	5.5%	4.8%	4.4%	30.8%
(4) Cumulative %	1.5%	4.6%	12.4%	21.6%	28.9%	35.6%	41.5%	48.7%	54.5%	60.0%	64.8%	69.2%	100.0%
(5) % w/ Life > N yrs	98.5%	95.4%	87.6%	78.4%	71.1%	64.4%	58.5%	51.3%	45.5%	40.0%	35.2%	30.8%	0.0%

Note: Row (1) is the number of years that a firm can be in the 13 year sample. Rows (2) and (3) present the count and percent of total firms, respectively, of firms by firm life in the sample. Row (4) is the cumulative of row (3). Row (5) is 100% minus row (4). As a point of reference, row (5) shows that almost two-thirds of the firms (64.4%) are in the sample for at least five years.

Table 11. CEO Tenure.

(1) Life - N years	1	2	3	4	5	6	7	8	9	10	11	12	>12
(2) CEOs with N yr tenure	831	507	546	431	490	372	304	271	322	212	146	129	649
(3) % of Total	16.0%	9.7%	10.5%	8.3%	9.4%	7.1%	5.8%	5.2%	6.2%	4.1%	2.8%	2.5%	12.4%
(4) Cumulative %	16.0%	25.7%	36.2%	44.4%	53.8%	61.0%	66.8%	72.0%	78.2%	82.3%	85.1%	87.5%	100.0%
(5) % with Life > N yrs	84.0%	74.3%	63.8%	55.6%	46.2%	39.0%	33.2%	28.0%	21.8%	17.7%	14.9%	12.5%	0.0%

Note: Row (1) is CEO tenure as the CEO at a given firm and rows (2) and 3 are the count and percent, respectively, of CEOs by CEO tenure; note that 649 CEOs (12.4%) of the 5,210 CEOs in the sample were CEOs prior to 1993 (1993 is the beginning of the sample period). Row (4) is the cumulative of row (3). Row (5) is 100% minus row (4).

Table 12. Average Ratio Stickiness.

Firm-Tenure	Elite CEO Status	
	By Top 10%	By Top 15%
As CEO	%	%
N years	%	%
1	100.00%	100.00%
2	98.59%	98.07%
3	92.40%	96.42%
4	92.41%	94.38%
5	92.17%	89.90%
6	85.98%	83.57%
7	80.67%	81.48%
8	85.90%	86.83%
9	79.63%	88.53%
10	81.43%	73.64%
11	69.09%	78.64%
12	58.33%	72.62%
13	62.72%	63.92%

Note: CEOs that are Elite CEOs for at least one year using the Average Ratio approach of ranking and classifying CEOs as Elite with the indicated cutoff. The indicated % is the number of years classified as Elite using the Average Ratio approach with the indicated cut-off divided by the CEO's firm-tenure.

Table 13. Elite CEO Count by Year.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Overall
All CEO Count	1,622	1,688	1,778	1,902	1,962	1,996	1,897	1,807	1,764	1,801	1,847	1,789	1,675	5,210
Elite CEO Count	116	128	145	167	193	201	197	190	209	217	231	234	226	522
% Elite	7.2%	7.6%	8.2%	8.8%	9.8%	10.1%	10.4%	10.5%	11.8%	12.0%	12.5%	13.1%	13.5%	10.0%

Note: This table presents the count of all CEOs in the sample by year. Also, this table presents the count and percent of total of Elite CEOs by year. CEOs are ranked and classified using the Average Ratio as a proxy for CEO managerial power as described in sub-section 6.2. The cut-off for Elite CEO status for this table and my base case regressions is the top 10%.

Table 14. Univariate Comparison of Variables' Means and Medians: Elite versus Non-Elite CEOs.

Variable	Non-Elite CEOs	Elite CEOs	t-test	Non-Elite CEOs	Elite CEOs	Wilcoxon
	Mean	Mean		Median	Median	
CEO Compensation Variables						
Salary [\$ Thousands]	572	726	0.00***	509	682	0.00***
Bonus[\$ Thousands]	612	1,106	0.00***	300	575	0.00***
Equity [\$ Thousands]	2,086	5,731	0.00***	572	1,940	0.00***
Other [\$ Thousands]	335	756	0.00***	38	85	0.00***
Total Compensation [\$ Thousands]	3,606	8,319	0.00***	1,722	4,044	0.00***
CEO Characteristics						
CEO Age [Years]	55.5	54.4	0.00***	55.0	55.0	0.00***
CEO Age Squared	3,143	3,015	0.00***	3,025	3,025	0.00***
CEO Firm-Tenure [Years]	6.4	6.2	0.17	4.0	4.0	0.02**
Average Ratio	1.63	4.18	0.00***	1.61	3.47	0.00***
Average CCI	0.27	0.34	0.00***	0.26	0.32	0.00***
Firm Performance Variables						
ROA [%]	3.3	3.5	0.67	4.1	4.1	0.74
ROE [%]	6.5	9.8	0.52	12.7	12.8	0.09*
NI 3-Year Growth Rate [%]	27.2	29.2	0.73	15.4	16.8	0.02**
NI 5-Year Growth Rate [%]	20.8	23.7	0.01**	14.0	15.5	0.00***
Shareholder 1-Year Return [%]	20.8	22.8	0.10*	12.4	13.2	0.20
Shareholder 3-Year Return [%]	14.0	15.4	0.02**	11.9	12.8	0.07*
Shareholder 5-Year Return [%]	12.1	13.2	0.01***	11.5	12.5	0.03**
Market Value/Book Value	2.08	2.14	0.31	1.47	1.55	0.00***
Firm Characteristics						
Sales [\$Millions]	3,866	4,431	0.02**	949	1,211	0.00***
Stock Volatility	0.43	0.47	0.00***	0.37	0.40	0.00***
Liabilities/Assets	0.57	0.59	0.00***	0.57	0.59	0.00***
PPE/Assets	0.29	0.27	0.00***	0.23	0.21	0.00***
RD/Assets	0.01	0.01	0.41	0.00	0.00	0.06*
Governance Index	9.0	9.2	0.00***	9.0	9.2	0.00***

Note: CEOs are ranked and classified using the Average Ratio as a proxy for CEO managerial power as described in sub-section 6.1. The cut-off for Elite CEO status for this table and my base case regressions is the top 10%. The t-test compares the respective mean of the two classes and the Wilcoxon test compares the medians of the two classes.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 15. CEO Compensation Regression Model: Comparison to Extant Models.

	Malmendier and Tate 2005³⁹	Brick et al⁴⁰ 2006	Bebchuk and Grinstein 2005	Milbourn 2003	Cyert, Kang, Kumar 2002	Pate 2008
Dependent Variable						
Log of CEO compensation	Various time periods ⁴¹	Yes ³	Yes ⁴²		Yes ⁴³	Yes ⁴⁴
CEO pay sensitivity				Yes		
Independent Variables						
<i>Firm characteristics</i>						
Firm size (log of sales)	Not Significant					
Firm size (log of sales _{t-1})		Positive	Positive			Positive
Firm size (market equity)				Negative		
Firm size (log of net assets)					Positive, Mixed Significance	
Stock Return					Positive, Mixed Significance	
Return on Equity					Mixed Sign, Mixed Significance	
ROA	Mixed Significance					
Q _{t-1}		Positive				
ROA _{t-1}		Not Significant				Not Significant

(Continued next page)

³⁹ Regressions with only CEO award winners.

⁴⁰ Brick, Palmon and Wald 2006

⁴¹ Ran regressions with both total and cash compensation.

⁴² Ran regressions with total, equity and non-equity compensation.

⁴³ Three regressions: base salary, equity compensation, and discretionary compensation.

⁴⁴ For this table I am only comparing my regression with the natural log of CEO total direct compensation for all CEOs.

Table 15 continued.

	Malmendier and Tate 2005	Brick et al 2006	Bebchuk and Grinstein 2005	Milbourn 2003	Cyert, Kang, Kumar 2002	Pate 2008
Mean ROA _{t-1, t-3}		Not Significant				
Stock return _{t-1, t-3}		Positive				Positive
Cash flow risk		Mixed Significance				
Stock volatility		Mixed Significance			Positive	Not Significant
Log (employees _{t-1})		Positive				
R&D _{t-1} /assets _{t-1}		Mixed Significance				Not Significant
Advertising _{t-1} /assets _{t-1}		Mixed Significance				
Debt _{t-1} /assets _{t-1}		Mixed Significance				
PP&E _{t-1} /assets _{t-1}		Negative				Negative
Investments _{t-1} /assets _{t-1}		Mixed Significance				
Log(1+Firm ROA _{t-1})			Positive			
Log(1+Firm Return _{t-1})			Positive			
Log(1+Firm Return _{t-2})			Positive ⁴⁵			
Default Risk					Negative	
Financial Leverage					Mixed Sign, Mixed Significance	Not Significant
Growth opportunities					Mixed Sign, Mixed Significance	Positive

(Continued next page)

⁴⁵ Statistical Significance depends on level of compensation used in regression.

Table 15 continued.

	Malmendier and Tate 2005	Brick et al 2006	Bebchuk and Grinstein 2005	Milbourn 2003	Cyert, Kang, Kumar 2002	Pate 2008
<i>CEO characteristics</i>						
CEO age	Not Significant			Negative	Mixed Sign, Mixed Significance	Not Significant
CEO gender		Mixed Significance				
CEO stock ownership [%]		Negative			Positive	
CEO is chairman		Mixed Significance			Positive	
Internal CEO		Negative				
<i>CEO reputation (Milbourn)</i>						
CEO tenure (experience)	Not Significant	Mixed Significance		Positive	Mixed Sign	Positive
Dow Jones Hits				Positive		
Outsider				Positive		
Industry adj. firm performance				Positive ⁴⁶		
<i>Board characteristics</i>						
Number of board meetings		Mixed Significance				
Excess director total comp.		Positive				
Proportion of outside directors					Positive, Mixed Significance	
Board Size					Mixed Sign, Mixed Significance	
Governance Index						Not Significant
(Continued next page)						

⁴⁶ Industry adjusted stock price performance for 1 year, 3 years, or 5 years prior with current CEO at the helm. Used only one of these in a given model.

Table 15 continued

	Malmendier and Tate 2005	Brick et al 2006	Bebchuk and Grinstein 2005	Milbourn 2003	Cyert, Kang, Kumar 2002	Pate 2008
<i>Ownership Characteristics</i>						
Largest stock ownership, non-CEO [%]					Negative, Mixed Significance	
Largest stock ownership, CEO [%]					Negative, Mixed Significance	
Compensation committee ownership [%]					Negative	
Internal Blockholder > 5%					Not Significant	
External Blockholder > 5%					Positive, Mixed Significance	
<i>Other independent variables</i>						
1 year after award	Positive					
2 years after award	Positive					
3 years after award	Positive					
Firm fixed-effects	Included		Included			Included
Year fixed-effects	Included	Included	Positive ⁴⁷	Included		Included
SIC (industry) dummies		Included		Included		Included
Regulated industry					Negative, Mixed Significance	
R ²	0.14 to 0.35	0.46 to 0.80	0.56	0.08	0.34 to 0.52	0.39
<i>Data</i>						
Time period	1992-2002	1992-2001	1993-2003	1993-1998	1992-1993	1993-2005
Number of Firms	594-760 ⁴⁸	1,435	1,500	1,500	1,648	2,746

Note: This table lists the variables and presents the sign and significance of the results of prior research that performed regressions with some component of CEO compensation as the dependent variable compared to my regression with using the natural log of CEO total direct compensation for all CEOs in my sample.

⁴⁷ Positive and statistically significant for each year 1994 through 2003.

⁴⁸ Without CEO age variable.

Table 16. CEO Compensation Regressions, Modified Chow Test.

<u>Dependent Variable</u>	<u>Average Ratio</u>		<u>Average CCI</u>	
	<u>Top 10%</u>	<u>Top 20%</u>	<u>Top 10%</u>	<u>Top 20%</u>
ln of Salary	0.000 ^{***}	0.002 ^{**}	0.000 ^{***}	0.001 ^{***}
ln of Bonus	0.071 [*]	0.109	0.243	0.346
ln of Equity	0.000 ^{***}	0.000 ^{***}	0.000 ^{***}	0.000 ^{***}
ln of Other	0.000 ^{***}	0.000 ^{***}	0.000 ^{***}	0.047 ^{**}
ln of Total Compensation	0.002 ^{***}	0.000 ^{***}	0.000 ^{***}	0.010 ^{***}
(a) Firm Life = 13 years	0.031 ^{**}	0.000 ^{***}	0.007 ^{***}	0.338

Note: This table presents the results of modified Chow Test (the Elite CEO dummy term is interacted with all explanatory variables except not with the year and industry dummies) to determine if Elite CEOs are compensated differently than Non-Elite CEOs; see Equation (1) in section 4.2 for the complete regression model. The Average Ratio and Average CCI are proxies for CEO managerial power and are used to rank and classify CEO elite status (these proxies are more fully described in Section 6). The results indicate that Elite CEOs are compensated differently than Non-Elite CEOs for all components of compensation except for bonus compensation. Row (a) is a sensitivity case for the natural log of total compensation with only the 847 firms that are in the sample all 13 years.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 17. CEO Compensation Regressions, Alternate Modified Chow Test.

<u>Dependent Variable</u>	<u>Average Ratio</u>		<u>Average CCI</u>	
	<u>Top 10%</u>	<u>Top 20%</u>	<u>Top 10%</u>	<u>Top 20%</u>
In of Salary	0.000 ^{***}	0.001 ^{***}	0.000 ^{***}	0.000 ^{***}
In of Bonus	0.070 [*]	0.109	0.262	0.222
In of Equity	0.000 ^{***}	0.000 ^{***}	0.000 ^{***}	0.000 ^{***}
In of Other	0.000 ^{***}	0.000 ^{***}	0.000 ^{***}	0.043 ^{**}
In of Total Compensation	0.003 ^{***}	0.000 ^{***}	0.090 [*]	0.050 ^{**}
(a) Firm Life = 13 years	0.040 ^{**}	0.000 ^{***}	0.043 ^{**}	0.520

Note: This table presents the results of an alternate modified Chow Test (the Elite CEO dummy term is interacted with all explanatory variables except not with the year and industry dummies) to determine if Elite CEOs are compensated differently than Non-Elite CEOs; see Equation (1) in section 4.2 for the complete regression model. However, the alternate modified Chow Test excludes the Elite CEO intercept from the test. The Average Ratio and Average CCI are proxies for CEO managerial power and are used to rank and classify CEO elite status (these proxies are more fully described in Section 6). The results indicate that Elite CEOs are compensated differently than Non-Elite CEOs for all components of compensation except for bonus compensation. Row (a) is a sensitivity case and is for the natural log of total compensation with only the 847 firms that are in the sample all 13 years.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 18. CEO Total Direct Compensation Regressions.

Variable	Elite CEO Interaction Terms	All	Non-Elite	Elite	Exp. Sign	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO Dummy		0.769				
ROA	0.002	0.000	0.001	0.001	0.007	Pos
Net Income 3-Year Growth Rate	0.000	0.000	0.000	0.000	0.000	Pos
Shareholder 3-Year Return	0.004***	0.000	0.003***	0.003***	0.003**	Pos
Ln Sales	0.303***	-0.045*	0.309***	0.269***	0.414***	Pos
Stock Volatility	-0.069	0.218	-0.063	-0.133	0.603	Pos
TotalLiabilities/Assets	-0.068	-0.044	-0.050	-0.042	-0.654**	Pos
PPE/Assets	-0.537***	0.405**	-0.462***	-0.505***	-0.217	Pos
RD/Assets	-0.603	0.716	-0.545	-0.767**	1.599	Pos
MarketToBook Ratio	0.022**	0.072***	0.030***	0.029***	0.091***	Pos
CEOAge	0.040***	-0.006	0.043***	0.042***	0.081	Pos
CEOAge ²	-0.000***	0.000	-0.000***	-0.000***	-0.001	Pos
CEOTenure	0.007***	0.012*	0.007***	0.007***	0.024**	Pos
Governance Index	0.006	-0.022	0.002	0.004	0.034	Pos
Constant	4.072***		4.000***	4.254***	2.455	
Modified Chow Test		0.000***				
R-squared		0.406	0.384	0.450	0.268	
Observations		12,557	12,557	11,353	1,204	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p < 0.1; ** p < 0.05; *** p < 0.01

Table 19. CEO Equity-Based Compensation Regressions.

Variable		Elite CEO Interaction Terms	All	Non-Elite	Elite	Exp. Sign
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO Dummy		-3.712				
ROA	-0.011	0.031	-0.009	-0.013	0.064	Pos
Net Income 3-Year Growth Rate	-0.001	0.007**	0.000	-0.001	0.005	
Shareholder 3-Year Return	0.011***	0.000	0.010***	0.011***	-0.003	Pos
Ln Sales	-0.603***	0.000	-0.655***	-0.645***	-0.481	Pos
Stock Volatility	-1.887***	-3.411**	-2.176***	-2.472***	-1.288	Pos
TotalLiabilities/Assets	2.708***	-0.611	2.692***	2.805***	0.397	Pos
PPE/Assets	-0.180	1.853	0.017	-0.303	1.609	Pos
RD/Assets	-2.788	4.230	-2.658	-2.800	0.247	Pos
MarketToBook Ratio	0.028	0.042	0.031	0.011	0.235	Pos
CEOAge	-0.048	0.195	-0.034	-0.074	0.472	Pos
CEOAge ²	0.000	-0.001	0.000	0.000	-0.004	Pos
CEOTenure	0.025**	-0.070*	0.020	0.029**	-0.024	Pos
Governance Index	-0.056	0.081	-0.044	-0.050	0.164	Pos
Constant	9.552***		9.425***	10.796***	-7.378	
Modified Chow Test		0.000***				
R-squared		0.095	0.094	0.100	0.008	
Observations		12,557	12,557	11,353	1,204	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 20. CEO Other Compensation Regressions.

Variable	Elite CEO Interaction Terms	All	Non-Elite	Elite	Exp. Sign	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO Dummy		-2.681				
ROA	-0.005	-0.001	-0.005	-0.005	-0.014	Pos
Net Income 3-Year Growth Rate	-0.001	0.002	0.000	-0.001	0.001	Pos
Shareholder 3-Year Return	0.004***	0.000	0.005***	0.003**	0.012***	Pos
Ln Sales	0.535***	0.000	0.537***	0.521***	0.918***	Pos
Stock Volatility	-0.922***	-0.324	-1.018***	-0.961***	-0.383	Pos
TotalLiabilities/Assets	0.005	2.164***	0.339	-0.005	2.236***	Pos
PPE/Assets	-1.777***	1.488**	-1.524***	-1.651***	-0.710	Pos
RD/Assets	0.007	6.463	0.376	-0.421	4.481	Pos
MarketToBook Ratio	-0.031	-0.033	-0.035	-0.032	-0.109	Pos
CEOAge	0.219***	0.017	0.224***	0.231***	0.095	Pos
CEOAge ²	-0.002***	0.000	-0.002***	-0.002***	-0.001	Pos
CEOTenure	-0.001	0.016	0.000	-0.001	0.010	Pos
Governance Index	0.013	-0.026	0.014	0.029	-0.128	Pos
Constant	-6.428***		-6.848***	-6.833***	-5.54	
Modified Chow Test		0.000***				
R-squared		0.146	0.153	0.146	0.141	
Observations		12,557	12,557	11,353	1,204	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 21. CEO Salary Compensation Regressions.

Variable		Elite CEO Interaction Terms	All	Non-Elite	Elite	Exp. Sign
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO Dummy		2.06				
ROA	-0.005	0.017**	-0.003	-0.006*	0.003	Pos
Net Income 3-Year Growth Rate	0.000	0.001	0.000	0.000*	0.001	
Shareholder 3-Year Return	0.001	0.000	0.001	0.001	-0.002	Pos
Ln Sales	0.244***	-0.068**	0.233***	0.238***	0.128	Pos
Stock Volatility	-0.587***	-0.514*	-0.618***	-0.502***	-2.277***	Pos
TotalLiabilities/Assets	-0.101	0.565***	-0.006	-0.121	-0.207	Pos
PPE/Assets	0.032	-0.172	0.035	0.042	-0.657	Pos
RD/Assets	-0.172	0.079	-0.204	-0.279	0.409	Pos
MarketToBook Ratio	-0.029***	0.022	-0.027***	-0.025**	-0.026	Pos
CEOAge	0	-0.075	0.013	0.016	-0.039	Pos
CEOAge ²	0.000	0.001	0.000	0.000	0.000	Pos
CEOTenure	0.011***	-0.019**	0.010***	0.012***	-0.011	Pos
Governance Index	0.003	0.031*	0.006	0.003	0.071	Pos
Constant	4.343***		4.461***	4.402***	7.011***	
Modified Chow Test		0.004***				
R-squared		0.078	0.079	0.091	0.023	
Observations		12,557	12,557	11,353	1,204	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 22. CEO Bonus Compensation Regressions.

Variable		Elite CEO Interaction Terms	All	Non-Elite	Elite	Exp. Sign
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO Dummy		-3.712				
ROA	-0.011	0.031	-0.009	-0.013	0.064	Pos
Net Income 3-Year Growth Rate	-0.001	0.007**	0.000	-0.001	0.005	
Shareholder 3-Year Return	0.011***	0.000	0.010***	0.011***	-0.003	Pos
Ln Sales	-0.603***	0.000	-0.655***	-0.645***	-0.481	Pos
Stock Volatility	-1.887***	-3.411**	-2.176***	-2.472***	-1.288	Pos
TotalLiabilities/Assets	2.708***	-0.611	2.692***	2.805***	0.397	Pos
PPE/Assets	-0.180	1.853	0.017	-0.303	1.609	Pos
RD/Assets	-2.788	4.230	-2.658	-2.800	0.247	Pos
MarketToBook Ratio	0.028	0.042	0.031	0.011	0.235	Pos
CEOAge	-0.048	0.195	-0.034	-0.074	0.472	Pos
CEOAge ²	0.000	-0.001	0.000	0.000	-0.004	Pos
CEOTenure	0.025**	-0.070*	0.020	0.029**	-0.024	Pos
Governance Index	-0.056	0.081	-0.044	-0.050	0.164	Pos
Constant	9.552***		9.425***	10.796***	-7.378	
Modified Chow Test		0.109				
R-squared		0.001	0.000	0.000	0.006	
Observations		12,557	12,557	11,353	1,204	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 23. Firm Performance Regression Model: Comparison to Extant Models.

	Mehran 1995	Malmendier and Tate 2005	Brick et al 2006	Daines et al 2005	Pate 2008
Dependent Variable					
Tobin's Q	Included				
Return on Assets	Included	Various periods		Included	
1-year excess returns Firm Performance			Included ⁴⁹	Included ⁵⁰	8 Measures
Independent Variables					
<i>Firm characteristics</i>					
Firm size (log of tot assets)	Negative				
Firm size (log of sales)		Negative			Negative ⁵¹
Firm size (log of sales _{t-1})			Not reported		
R&D/Sales (Inv+PP&E)/total assets	Positive Not significant				
LT debt/ total assets	Not significant				Positive ⁵²
Q _{t-1}			Not reported		
ROA _{t-1}		Positive	Not reported		
Mean ROA _{t-1, t-3}			Not reported		
Stock return _{t-1, t-3}			Not reported		
Cash flow risk			Not reported		
Stock volatility			Not reported		Positive ⁵³
Log (employees _{t-1})			Not reported		
R&D _{t-1} /assets _{t-1}			Not reported		Not significant
Advertising _{t-1} /assets _{t-1}			Not reported		
Debt _{t-1} /assets _{t-1}			Not reported		
PP&E _{t-1} /assets _{t-1}			Not reported		Not significant ⁵⁴
Investments _{t-1} /assets _{t-1}			Not reported		
Market to Book Ratio					Negative ⁵⁵

(Continued next page)

⁴⁹ One-factor model and Fama-French three-factor model.⁵⁰ Fama-French four-factor model.⁵¹ Statistically significant and negative for 6 of 7 cases that have log of sales as a control variable.⁵² Statistically significant and positive for 7 of 8 cases.⁵³ Statistically significant and positive for 4 of 7 cases that have Black-Scholes stock volatility as a control variable.⁵⁴ Not significant for 5 of 8 cases. Statistically significant and positive for 3 of 8 cases.⁵⁵ Statistically significant and negative for 5 of 7 cases that have market to book ratio as a control variable.

Table 23 continued.

	Mehran 1995	Malmendier and Tate 2005	Brick et al ¹⁴ 2006	Daines et al ¹⁵ 2005	Pate 2008
<i>CEO characteristics</i>					
CEO age					Mixed ⁵⁶
CEO age ²					Mixed
CEO tenure (experience)			Not reported		Not significant
CEO gender			Not reported		
CEO's equity-based comp [% of total comp]	Positive				
% equity owned by CEO	Positive		Mixed significance		
CEO is chairman			Not significant		
Internal CEO			Mixed significance		
Log (CEO's total comp.)			Negative ⁵⁷		
Log (CEO salary)					Mixed
Log (CEO bonus)					Mixed
Log (CEO equity)					Mixed
Log (CEO Other)					Not significant
<i>Board characteristics</i>					
% shares held by outside directors	Not significant				
Outside directors [% of board]	Not significant				
Number of board meetings			Not significant		
Excess director total comp.			Positive		
Log (director's total comp.)			Negative		
Governance Index					Not significant

(Continued next page)

⁵⁶ Mixed significance depending upon the dependent variable.

⁵⁷ Mixed significance depending upon which model is used (pooled versus fixed-effects, one-factor versus Fama-French three-factor model).

Table 23 continued.

	Mehran 1995	Malmendier and Tate 2005	Brick et al¹⁴ 2006	Daines et al¹⁵ 2005	Pate 2008
<i>Other independent variables</i>					
1 year after award		Negative			
2 years after award		Negative			
3 years after award		Negative			
Firm fixed-effects		Included			
Year fixed-effects		Included	Included		
SIC (industry) dummies			Included		
Prior good performance for highly paid CEOs				Mixed significance ⁵⁸	
Prior bad performance for highly paid CEOs				Mixed significance	
Highly paid CEO dummy				Mixed significance	
Prior good performance				Mixed significance	
Prior bad performance				Mixed significance	
<i>Data</i>					
R ²	0.03-0.43	0.12-0.17	0.01-0.10	0.01-0.30	0.01-.12
Time period	1979-1980	1992-2002	1992-2001	1992-2001	1993-2005
Number of firms	153	608-775	1193-1336	2,284	2,710

Note: This table lists the variables and presents the sign and significance of the results of prior research that performed regressions with some measure of firm performance as the dependent variable.

⁵⁸ Mixed significance depending upon how they broke out the regressions: i.e., by firm size, by management constraints, by level of incentive pay, and by whether or not there is a 5% blockholder.

Table 24. Firm Performance Regressions, Modified Chow Test.

	<u>Average Ratio</u>	<u>Average CCI</u>
<u>Dependent Variable</u>	<u>Top 10%</u>	<u>Top 10%</u>
Return on Assets	0.000 ^{***}	0.000 ^{***}
Return on Equity	0.992	0.928
Shareholder 1-Year Return	0.000 ^{***}	0.000 ^{***}
Market to Book Ratio	0.000 ^{***}	0.000 ^{***}
Net Income 3-Year Growth Rate	0.002 ^{***}	0.000 ^{***}
Shareholder 3-Year Return	0.000 ^{***}	0.008 ^{***}
Net Income 5-Year Growth Rate	0.000 ^{***}	0.000 ^{***}
Shareholder 5-Year Return	0.001 ^{***}	0.005 ^{***}

Note: This table presents the results of modified Chow Test (the Elite CEO dummy term is interacted with all explanatory variables except not with the year and industry dummies) to determine if Elite CEOs' firms perform differently than Non-Elite CEOs' firms; see Equation (3) in section 4.4 for the complete regression model. The Average Ratio and Average CCI are proxies for CEO managerial power and are used to rank and classify CEO elite status (these proxies are more fully described in Section 6). The results indicate that Elite CEOs' firms do perform differently than Non-Elite CEOs' firms for all measures of firm performance except for return on equity.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 25. Firm Performance Regressions, Alternate Modified Chow Test.

	<u>Average Ratio</u>	<u>Average CCI</u>
<u>Dependent Variable</u>	<u>Top 10%</u>	<u>Top 10%</u>
Return on Assets	0.000 ^{***}	0.000 ^{***}
Return on Equity	0.992	0.931
Shareholder 1-Year Return	0.000 ^{***}	0.000 ^{***}
Market to Book Ratio	0.000 ^{***}	0.000 ^{***}
Net Income 3-Year Growth Rate	0.002 ^{***}	0.000 ^{***}
Shareholder 3-Year Return	0.000 ^{***}	0.007 ^{***}
Net Income 5-Year Growth Rate	0.000 ^{***}	0.000 ^{***}
Shareholder 5-Year Return	0.002 ^{***}	0.005 ^{***}

Note: This table presents the results of the alternate modified Chow Test (the Elite CEO dummy term is interacted with all explanatory variables except not with the year and industry dummies) to determine if Elite CEOs' firms perform differently than Non-Elite CEOs' firms; see Equation (3) in section 4.4 for the complete regression model. However, the alternate modified Chow Test excludes the Elite CEO intercept from the test. The Average Ratio and Average CCI are proxies for CEO managerial power and are used to rank and classify CEO elite status (these proxies are more fully described in Section 6). The results indicate that Elite CEOs' firms do perform differently than Non-Elite CEOs' firms for all measures of firm performance except for return on equity.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 26. Shareholder 5-Year Return Regressions.

Variable	Elite CEO Interaction Terms		All	Non-Elite	Elite	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO dummy		26.180				
lnSales	-13.733***	0.824	-13.623***	-14.154***	-12.662***	NS
Stock Volatility	12.742***	-1.971	12.851***	10.742***	14.975***	NS
TotalLiabilities/Assets	32.053***	-1.094	32.006***	32.334***	24.644***	NS
PPE/Assets	12.537***	1.680	12.908***	11.824***	22.211***	NS
RD/Assets	-1.776	-1.627	-1.719	-3.674	-3.865	NS
MarketToBook Ratio	-1.002***	-0.645***	-1.068***	-0.989***	-1.425***	NS
lnSalary	0.433**	0.163	0.511***	0.340*	0.886***	NS
lnBonus	-0.444***	0.104	-0.434***	-0.446***	-0.213**	NS
lnEquity	-0.142***	0.167**	-0.120***	-0.154***	0.009	NS
lnOther	-0.041	-0.199	-0.049	-0.009	-0.563***	NS
CEO Age	0.715**	-1.418*	0.625**	0.598*	1.588	Pos
CEO Age ²	-0.006**	0.015*	-0.005**	-0.005*	-0.013	Pos
CEO Tenure	0.028	-0.016	0.029	0.038	0.086	Pos
Average Ratio			0.598**	1.908***	-1.169	Pos
Governance Index	-0.703***	0.052	-0.739***	-0.865***	-0.231	Neg
Constant	69.063***		68.479***	74.600***	32.639	
Modified Chow Test		0.001***				
R-squared		0.00	0.00	0.00	0.01	
Observations		10,557	10,557	9,147	1,410	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 27. Shareholder 3-Year Return Regressions.

Variable	Elite CEO Interaction Terms		All	Non-Elite	Elite	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO dummy		-48.876				
lnSales	-18.839***	-1.057	-19.107***	-18.782***	-25.802***	NS
Stock Volatility	18.735***	8.162*	19.263***	18.397***	31.892***	NS
TotalLiabilities/Assets	43.534***	5.302	44.788***	42.079***	46.434***	NS
PPE/Assets	23.666***	1.768	24.555***	24.250***	18.804	NS
RD/Assets	6.955	69.310**	11.403	5.584	33.729	NS
MarketToBook Ratio	-1.369***	-1.016***	-1.470***	-1.359***	-2.351***	NS
lnSalary	0.632***	0.013	0.645***	0.486**	1.096**	NS
lnBonus	-0.366***	0.274**	-0.329***	-0.370***	-0.209	NS
lnEquity	-0.203***	-0.081	-0.211***	-0.216***	-0.171	NS
lnOther	-0.092	-0.064	-0.093	-0.058	-0.451*	NS
CEO Age	0.409	1.573	0.561	0.399	3.764**	Pos
CEO Age ²	-0.004	-0.012	-0.005	-0.004	-0.031**	Pos
CEO Tenure	0.055	-0.044	0.049	0.094	0.128	Pos
Average Ratio			0.611**	2.420***	0.431	Pos
Governance Index	-0.319	0.166	-0.305	-0.406	0.348	Neg
Constant	91.529***		85.927***	89.649***	45.220	
Modified Chow Test		0.000***				
R-squared		0.02	0.02	0.01	0.03	
Observations		14,900	14,900	13,008	1,892	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 28. Shareholder 1-Year Return Regressions.

Variable	Elite CEO Interaction Terms		All	Non-Elite	Elite	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO dummy		-57.451				
lnSales	-29.689***	-2.795*	-30.269***	-29.597***	-39.807***	NS
Stock Volatility	5.286	-16.905**	2.008	0.551	-37.996***	NS
TotalLiabilities/Assets	57.802***	12.423*	60.945***	56.424***	69.972***	NS
PPE/Assets	45.134***	-2.451	45.362***	51.404***	-3.459	NS
RD/Assets	27.894	3.354	26.337	28.985	-233.006*	NS
MarketToBook Ratio	-0.911***	-2.325***	-1.001***	-0.993***	-3.973***	NS
lnSalary	0.690	-0.390	0.594	0.623	0.625	NS
lnBonus	-0.136	0.618**	-0.061	-0.143	0.231	NS
lnEquity	-0.085	-0.793***	-0.180**	-0.103	-0.754***	NS
lnOther	0.008	0.252	0.035	0.029	-0.276	NS
CEO Age	1.777**	2.969	2.013**	1.896**	4.277	Pos
CEO Age ²	-0.016**	-0.023	-0.018**	-0.017**	-0.030	Pos
CEO Tenure	0.031	-0.540	-0.009	0.035	-0.669	Pos
Average Ratio			0.564	1.979	-1.996	Pos
Governance Index	0.788	-0.041	0.889	0.711	2.594	Neg
Constant	93.144***		88.215***	87.765***	142.629	
Modified Chow Test		0.000***				
R-squared		0.03	0.03	0.03	0.04	
Observations		19,990	19,990	17,547	2,443	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 29. Market to Book Ratio Regressions.

Variable		Elite CEO Interaction Terms	All	Non-Elite	Elite	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO dummy		-5.352*				
TotalLiabilities/Assets	0.192	0.155	0.173	0.313**	-0.276	NS
PPE/Assets	0.784***	0.304	0.788***	1.142***	-1.036*	NS
RD/Assets	2.180**	-0.193	2.080**	2.064**	1.578	NS
NI/Assets	1.597***	-1.030***	1.318***	1.671***	0.384***	NS
CEO Age	-0.158***	0.168	-0.146***	-0.152***	-0.220**	Pos
CEO Age ²	0.001***	-0.002	0.001***	0.001***	0.002*	Pos
CEO Tenure	-0.004	0.006	-0.004	-0.005	0.029	Pos
Average Ratio			-0.101***	-0.110**	-0.352***	Pos
Governance Index	0.005	0.052	0.008	0.011	0.05	Neg
Constant	6.557***		6.400***	6.281***	10.805***	
Modified Chow Test		0.001***				
R-squared		0.01	0.01	0.00	0.00	
Observations		22,856	22,856	20,506	2,350	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 30. Net Income 5-Year Growth Rate Regressions.

Variable	Elite CEO Interaction Terms		All	Non-Elite	Elite	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO dummy		-6.282				
lnSales	-16.937***	-0.541	-17.188***	-18.264***	-12.748***	NS
Stock Volatility	4.857	21.693***	6.933**	4.319	32.611**	NS
TotalLiabilities/Assets	30.033***	-7.278	28.733***	28.233***	36.371***	NS
PPE/Assets	6.807	-19.929***	4.334	6.623	-23.299	NS
RD/Assets	-7.397	29.686	-6.883	-7.495	21.224	NS
MarketToBook Ratio	-0.495***	-1.856***	-0.646***	-0.478***	-2.328***	NS
lnSalary	0.217	0.030	0.211	0.266	0.441	Pos
lnBonus	-0.712***	-0.069	-0.719***	-0.672***	-1.007***	Pos
lnEquity	-0.115**	-0.280**	-0.156***	-0.117**	-0.399**	Pos
lnOther	-0.086	-0.047	-0.095	-0.032	-0.379	Pos
CEO Age	0.765	0.516	0.867*	0.790	1.219	Pos
CEO Age ²	-0.008	-0.003	-0.008*	-0.008*	-0.011	Pos
CEO Tenure	0.023	0.308*	0.058	0.051	0.318	Pos
Average Ratio			0.374	1.083	-2.721	Pos
Governance Index	-0.764**	-0.362	-0.797**	-0.791**	-1.650	Neg
Constant	102.819***		101.756***	109.683***	81.361	
Modified Chow Test		0.000***				
R-squared		0.03	0.03	0.03	0.06	
Observations		6,239	6,239	5,458	781	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 31. Net Income 3-Year Growth Rate Regressions.

Variable	Elite CEO Interaction Terms		All	Non-Elite	Elite	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO dummy		130.293				
lnSales	-24.722***	-0.373	-24.817***	-26.084***	-29.016***	NS
Stock Volatility	12.094*	11.962	13.989**	8.804	42.649	NS
TotalLiabilities/Assets	51.663***	11.162	53.190***	47.910***	95.892***	NS
PPE/Assets	13.623*	-16.932	11.641	13.805	-17.597	NS
RD/Assets	-26.729	-1.745	-27.808	-27.568	-126.887	NS
MarketToBook Ratio	-0.967***	-2.703***	-1.201***	-0.906***	-4.295***	NS
lnSalary	0.417	-1.469	0.099	0.518	-1.196	Pos
lnBonus	-1.500***	-0.194	-1.516***	-1.463***	-1.611***	Pos
lnEquity	-0.070	-0.636**	-0.146*	-0.071	-0.534*	Pos
lnOther	-0.385**	1.051**	-0.257	-0.344*	0.668	Pos
CEO Age	2.573***	-4.054	2.344**	2.874***	-2.317	Pos
CEO Age ²	-0.024***	0.035	-0.022***	-0.027***	0.023	Pos
CEO Tenure	0.040	0.575*	0.123	0.081	0.514	Pos
Average Ratio			0.226	2.204	-17.803**	Pos
Governance Index	-0.555	-0.747	-0.697	-0.771	-0.243	Neg
Constant	114.013***		123.339***	115.897***	299.092**	
Modified Chow Test		0.002***				
R-squared		0.02	0.02	0.02	0.01	
Observations		9,955	9,955	8,758	1,197	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 32. Return on Assets Regressions.

Variable	Elite CEO Interaction Terms		All	Non-Elite	Elite	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO dummy		-15.879				
lnSales	-1.471***	-0.385	-1.724***	-1.735***	-3.497**	NS
Stock Volatility	-3.949***	-8.961***	-6.618***	-3.846***	-26.646***	NS
TotalLiabilities/Assets	18.288***	37.016***	25.489***	13.443***	97.550***	NS
PPE/Assets	-0.580	0.206	-0.898	1.481	-34.024***	NS
RD/Assets	10.283	-17.004	7.694	3.171	-22.901	NS
MarketToBook Ratio	0.419***	0.933***	0.486***	0.464***	1.449***	NS
lnSalary	-0.295**	-0.162	-0.266**	-0.328**	-0.207	Pos
lnBonus	0.271***	0.104	0.294***	0.261***	0.252**	Pos
lnEquity	0.024	-0.078	0.005	0.023	-0.150	Pos
lnOther	0.090*	-0.058	0.077*	0.045	0.040	Pos
CEO Age	0.095	-0.023	0.078	0.210	-1.100	Pos
CEO Age ²	0.000	0.001	0.000	-0.002	0.011	Pos
CEO Tenure	-0.005	-0.144	-0.006	0.014	-0.183	Pos
Average Ratio			0.206	1.216***	-2.405**	Pos
Governance Index	-0.199	-0.256	-0.162	-0.144	-0.093	Neg
Constant	4.796		3.048	2.950	32.354	
Modified Chow Test		0.000***				
R-squared		0.02	0.01	0.01	0.04	
Observations		20,124	20,124	17,669	2,455	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

Table 33. Return on Equity Regressions.

Variable	Elite CEO Interaction Terms		All	Non-Elite	Elite	
	(1)	(2)	(3)	(4)	(5)	(6)
Elite CEO dummy		31.499				
lnSales	3.082	0.735	2.807	4.971*	-6.180*	NS
Stock Volatility	0.516	-1.282	0.687	7.935	-9.723	NS
TotalLiabilities/Assets	-66.120***	77.850**	-55.510***	-75.130***	34.546**	NS
PPE/Assets	5.058	6.049	6.971	13.970	-78.400**	NS
RD/Assets	-52.355	6.163	-54.276	-54.836	-3.467	NS
MarketToBook Ratio	0.854*	0.807	0.968*	0.983*	2.279**	NS
lnSalary	-1.016	1.080	-0.534	-1.330	-0.857	Pos
lnBonus	0.620*	0.802	0.716*	0.564*	1.207***	Pos
lnEquity	1.197***	-0.672	1.097***	1.178***	0.419*	Pos
lnOther	-0.261	-0.456	-0.346	-0.241	-0.678*	Pos
CEO Age	3.945*	-2.626	3.650*	4.507*	-1.450	Pos
CEO Age ²	-0.035*	0.025	-0.033*	-0.040*	0.017	Pos
CEO Tenure	-0.021	-0.605	-0.030	0.126	-0.769*	Pos
Average Ratio			3.663*	13.720**	0.173	Pos
Governance Index	1.943	-1.262	1.952	2.471*	0.272	Neg
Constant	-130.194*		-136.227*	-149.226*	86.060	
Modified Chow Test		0.992				
R-squared		0.00	0.00	0.00	0.00	
Observations		19,707	19,707	17,310	2,397	

Note: Columns (1) and (2) are the results from one regression with coefficients on the independent variables presented in column (1) and the coefficients on the Elite CEO dummy and interaction terms are presented in column (2). The results in column (2) explain the story of how Elites CEOs are compensated differently than the Non-Elite CEOs. Columns (3), (4), and (5) present the results of three regressions (without the Elite CEO dummy or the interaction terms) for All CEOs, Non-Elite CEOs, and Elite CEOs, respectively; and are included as a frame of reference. Column (6) is the expected sign of the coefficients for all columns except column (2). I use firm fixed-effects, year dummies, and industry dummies in all regressions.

Legend: * p<0.1; ** p<0.05; *** p<0.01

VITA

Mark Jerome Pate was born in Guymon, Oklahoma on December 8th, 1955 to proud parents Charles and Estelle. He was raised in the Texaco “oil-patch” in many towns in Oklahoma and Kansas. He graduated from Edison High School in Tulsa, Oklahoma in 1973. After working for a couple of years he went to college and graduated with a B.S. in petroleum engineering from the University of Tulsa. He then worked in the oil and gas industry for 22 years before entering the Doctor of Philosophy in Business with concentration in Finance Program at the University of Tennessee.

Mark is currently an Assistant Professor at King College in Bristol, Tennessee.