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How Does Variability in Cash Flows and Returns Influence How Top Executives Are Paid?

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Abstract

I invoke agency theory to evaluate how top executives' compensation contracts are structured, conditional on risk in the firm's operating environment, focusing on the total, fixed, and variable components. The results suggest that companies exert some effort to adhere to agency theoretic principles in designing top executive compensation contracts. However, imperfections in the pay setting process mean that there is ample room for powerful CEOs to seek rents. Furthermore, when risk in the operating environment is measured with volatility in returns, non-CEO top executives sometimes bear greater risk than CEOs, collecting a greater percentage of their compensation in variable pay than most CEOs. The results are most distinct in the extreme deciles of volatility, suggesting that firms may be paying greater attention to compensation design in the most extreme settings of volatility. I offer potential explanations for this phenomenon.

1. INTRODUCTION

Top executive compensation continues to be a perplexing topic for researchers and regulators alike. This is largely because there are so many variables that play a role in determining an optimal compensation for top executives, some of them measurable, others not. For example, the executive's level of risk aversion is typically unknown and not all the actions she takes are observable. Yet her compensation has to be designed to optimally share risk in a way that provides her with adequate incentives while meeting her reservation wage.

Early works in the area include (Holmstrom 1979, Grossman and Hart 1983, and Holmstrom and Milgrom 1987. Relatively more recent works that examine these issues include Baker and Hall (2004), Christensen and Feltham (2005). I test classic agency theoretic recommendations for efficiently structuring managerial compensation by examining the performance-pay relation conditional on different proxies in the firm's risk environment. As is typical in the literature, I assume the executive is risk averse. I sort a data set of executive-firm-year observations into deciles on measures of risk. I use the standard deviation of cash flow from operations (scaled by average Net Operating Assets, NOA) and that of Cumulative Annual Returns as my measures of risk (e.g., Core et al. 1999).

I alternately regress measures of compensation (Total Pay, Fixed Pay, and Variable Pay) on performance measures and control variables. The performance measures are Return on Assets (ROA) and Cumulative Annual Returns when the risk measure is the standard deviation (SDV) of cash flows and it is Return on Equity (ROE) when the sorting is based on SDV of Cumulative Annual Returns.

I find that while compensation schemes largely adhere to the tenets of agency theory, imperfections in the process leaves room for rent extraction and other potential distortions like non-CEOs having more of their pay being variable than do CEOs.

Since risk aversion tends to decrease as wealth increases (e.g., Becker 2006), one would ordinarily expect CEOs to have larger proportion of variable pay than other top executives. Such imperfections may be contributing to the notion of excessive CEO compensation both in the popular press and sections of the executive compensation research community (e.g., Core et al. 1999, Bol 2008, Bebchuk and Fried, 2002).

Conditional on variability in Cumulative Annual Returns, CEOs in the Bottom 2 deciles of SDV of Cumulative Annual Returns who are also chairs of the board have much larger additional compensation even when risk in the environment is relatively low. Though this could be because firms with less volatile cash flows tend to be larger, and larger firms may require more work of the CEO who is also chairman. For example, Baker and Hall (2004) contends that size tends to drive a significant portion of top executives' pay. Furthermore, Xavier and Landier (2008) liken competition for a CEO position as a winner takes all tournament where small differences in talent can translate to very large difference in compensation, with the most talented people managing the largest firms.[1]

This paper contributes to the debate on top executive compensation by showing that though companies face a challenging job of designing optimal compensation contracts given all the variables they have to consider, they largely adhere to theoretical predictions. The paper does not explicitly assess optimality of association between pay and performance nor explicitly evaluate the pay-performance sensitivity[2]. It tests how

[1] Another potential source of the sense of inflated top executive compensation is that a significant portion of total compensation has little or no relation to performance. These include pensions, severance pay and other perks such as housing and transportation. Some of these tend to be in the "ALL OTHER" pay category in ExecuComp. These tend to inflate top executive pay without any clear link to performance.

[2] Technically, performance-pay sensitivity is the change in the executive's wealth for a unit change in shareholder wealth. Instead of rates of changes, I examine performance-pay relations in levels, with a focus on the components of the compensation conditional on risk in the firm's outputs.

pay is structured conditional on a proxy for risk in the operating environment and assuming a risk-averse agent. My findings help shed some light on potential sources of inefficiency in the top executive pay setting process. In particular, components of compensation such as pensions, severance packages and other perquisites that are not linked to performance and related subjectivity in the pay setting process (e.g., Boll 2008) are potential sources of inefficiency.

The rest of the paper is structured as follows. I review the pertinent literature and theory in the next section, present the research design and data sources in Section 3 and the results in Section 4. I discuss the results and conclude in Section 5.

2. LITERATURE AND BACKGROUND

Agency theory contends that in an ideal world, managers' compensation should be designed in such a way that it creates a separating equilibrium, attracting well suited candidates and dissuading ill-qualified candidates from applying. This is also known as a "first-best result" and in this setting, incentives are not very difficult issues (e.g., Bolton and Dawatripont, 2005) but this is only an idealized setting against which to judge real world contracts (Christensen and Feltham 2005). One way to implement a contract that gets close to the idealized result is, the task / job description could be designed to include items that well qualified candidates can easily do while those ill qualified would struggle to complete. In practice, though such perfect job designs are difficult to pull off. The problem is mitigated by credentials such as education and experience, augmented by thorough interviews and background checks.

According to agency theory, a major consideration in structuring compensation is the level of risk aversion of the agent (i.e., manager). Managers are generally assumed to be risk averse and principals, risk neutral. The risk neutral assumption for the principal (e.g. shareholders) is not unrealistic given the widely held beliefs in well-diversified portfolios (e.g., Markowitz 1952). For such a risk averse manager with a risk-neutral principal, the

optimal compensation contract is to pay her a fixed salary (e.g., Grossman and Hart 1983). However, the level of risk aversion in reality varies from manager to manager and shareholders are unlikely to be universally risk neutral. Thus, the principal has to provide the manager some incentives by sharing risk with her. But the principal faces a tough compensation design problem as the *more* risk averse a manager is the *more* costly it is to the principal / investor to have the manager share some of the risk inherent in the firm's operations since she has to be compensated with a risk premium for every additional unit of risk she bears. For example, Lambert et al (1991) and Hall and Murphy (2002 and 2003) show that it can be very expensive to have executives bear too much risk because they tend to assign much lower valuation to risky compensation such as stocks and options. In other words, executives require higher risk premia the more risk averse they are.

However, the debate about top executive compensation suggests that most top executives obtain the largest portion of their compensation from stocks and stock options (e.g. Frydman and Jenter 2010). This could be incompatible with the notion of the average typical top executive being risk averse as stocks and stock options can assign significant risk to the executive to the extent that their values can vary widely, sometimes independent of the executives' performance (e.g., Bolton and Dewatripont 2005) and can be correspondingly more costly to shareholders.

To induce an agent to accept a contract, the contract must meet the agent's reservation wage. That is, the compensation should be at least as much as her next best alternative (e.g., Laffont and Mortimort 2002, Christensen and Feltham 2005). Further, it must be incentive compatible. That is, it must induce her to give forth her best effort to satisfy her utility function. This suggests that the typical top executive contract would have a mix of fixed and variable compensation.

I apply agency theory's prescription for how a risk-averse manager should be compensated to top executives by examining their pay performance relation conditional on the risk in the firm's operating environment and the type of compensation.

As risk in the firm's environment increases, compensation should shift more toward fixed and away from variable pay. Furthermore, since the higher up a manager is in the organization, the "closer" she is to shareholders, and so the more risk she can be expected to bear compared to lower level executives, we should observe higher level employees (i.e., the CEO) bear more risk in her compensation than other executives, all else equal. This view is also supported by the fact that risk aversion tends to decrease in wealth (e.g., Becker 2006) and CEOs tend to be much wealthier than other executives.

Though the manager's actions may be unobservable, the outputs of those actions often are. Not only are summary reports such as the income available to investors, but investors can also infer the quality of the effort the manager put forth (e.g. Bolton and Dewatripont 2005) from outputs of her actions. The quality of the earnings is one way investors can evaluate the quality of the manager's effort. I use the quality of earnings as a proxy for the quality of effort that executives exerted and evaluate the role they play in the executive's compensation.

3. DATA AND RESEARCH DESIGN

I obtain executive compensation and related data from ExecuComp, company financial data from Compustat, and company returns data from CRSP. I estimate risk in the operating environment with two measures: variability in cash flows deflated by average Net Operating Assets (NOA), and variability in returns.

I sort the data into deciles of the two variability measures. These are the Standard Deviation (SDV) of Cash Flow from Operations (CFO) scaled by NOA and the Standard Deviation of Cumulative Annual Returns (e.g., Core et al. 1999). I estimate the following regression for total as well as the primary components of top executive compensation, fixed, and variable pay. I scale cash flow from operations with Net Operating Assets (NOA) because CFO typically derives from operating assets and larger NOA are likely to generate larger cash flow from operations.

The first estimation of the model is based on a sorting of the standard deviation SDV of CFO/Average NOA. I subsequently sort the data on SDV of Cumulative Annual Returns.

$$COMPENSATION = \alpha + \beta_1 MEASURE + \beta_2 BTM + \beta_3 DACC + \beta_4 LEVERAGE + \beta_5 LOSS + \beta_6 Z\text{-}SCORE + \beta_7 DUAL\_CEOCHAIR + \beta_8 IND + \beta_9 YEAR + \varepsilon \quad (1)$$

Where

COMPENSATION = Alternately, Total Compensation, Fixed Pay, and Variable Pay[3].
PERFORM = Is the firm's performance measure. It is alternately Return on Assets (ROA) and Cumulative Annual Returns when the data are sorted on Standard Deviation (SDV) of Cash flows (scaled by Net Operating Assets), and PERFORM = Return on Equity (ROE) when the data are sorted into deciles of Standard Deviation (SDV) of Cumulative Annual Return.
BTM = Ratio of book value to market value of equity
DACC = The Modified Jones Model Discretionary Accruals (Jones 1991, Dechow et al. 1995)
LOSS = 1 if the firm made a loss that year, 0 otherwise
Z-score = Zmijewski's (1984) Z-score. Higher numbers imply higher likelihood of financial distress
DUAL_CEOCHAIR = 1 if the CEO is also the chairman, 0 otherwise.
IND = Two digit SIC industry fixed effects
YEAR = Year fixed effects
ε = an error term that is $\sim N(0, \sigma^2)$

I present greater details of how Cumulative Annual Returns, Net Operating Assets (NOA) and Discretionary Accruals

[3] Fixed Pay is primarily composed of salary other non-variable pay. Variable Pay of bonus, stock and stock option awards.

(DACC), and the compensation variables are calculated in an appendix to the paper.

I first use Return on Assets (ROA) as the performance measure so that the pay-performance relation can be evaluated in the context of both debt and equity investors. Next, I use Cumulative Annual Returns as the performance measure to evaluate the performance-pay relation of top executives from the perspective of shareholders. Both measures are evaluated conditional on volatility in cash flows (i.e., SDV of CFO/Average NOA, the measure of risk in the operating environment).

Since stock returns are another source of risk in the firm's operating environment. I next evaluate the model based on a sorting on the SDV of Cumulative Annual Returns. The performance measure in this case is Return on Equity (ROE). The variability measures (SDV of CFO/Average NOA and SDV of Cumulative Annual Returns) are estimated from the five prior years' CFO / Average NOA and Cumulative Annual Returns.

I control for the quality of the executive's effort with Modified Jones Model Discretionary accruals (Jones 1991, Dechow et al. 1995). I control for the risk of financial distress with Zmijewski's Z-score and leverage with Debt / Total Assets. Since losses are less common because of the protection that bankruptcy provides, I control for loss years. CEOs who also chair the board tend to have much more power (e.g., Bebchuck and Fried 2002). I control for the notion of managerial power with CEO-chair Duality.

Since the financial crisis of 2007-2009, there has been strong public and regulatory outcry against what is perceived as excessive executive compensation. For example, this resulted in the curbing of top executive compensation at Troubled Asset Relief Program (TARP) firms (e.g., Shearman and Sterling 2008) for several years. It has also resulted in the SEC mandating such measures as "Say on Pay" where shareholders get to vote for or against top executive compensation proposals (SEC 2011). Currently firms are being required to report the multiple of the average employee's pay that the CEO gets (see for example,

Murphy 2012 and Eavis 2015). The crises period likely disrupted the usual norms of how top executive pay is structured. Therefore, I test the theories with data from 1992 to 2006 (the Execucomp data base started in 1992).

I require firms to have sufficient data to estimate the variability measures, the Modified Jones Model Discretionary Accrual measure, and all other variables used in the models. After excluding financial sector and utility companies, the final data set has 76,009 executive-firm-year-executive observations spanning 1992 to 2006. I winsorize the data at the 1.25% and 98.75% levels.

4. RESULTS

Descriptive Statistics

The average Total Compensation is $1.7 million with a standard deviation of $2.5 million, with variable pay being the largest component as indicated earlier – about $1 million versus $600 thousand for fixed pay (Table 1). With a standard deviation of $1.8 million for Total Variable Pay, most of the variability in total pay derives from Total Variable Pay compared to $800 thousand for Total Fixed Pay. There is also a wide range of firm sizes. Average Assets is $3 billion with a standard deviation of $6.5 billion. Similarly, the mean market Value if $4 billion, with a standard deviation of $9.7 billion. However, note that these average compensation and firm size numbers are likely larger for more recent years.

Mean ROA is 5%, Return on Equity (ROE), 7%, and Cumulative Annual Return, 17%. The disparity between accounting (ROA and ROE) and market returns is at least partly explained by the differences in how accounting and the markets operate (GAAP's asymmetrical conservatism versus the different levels of market efficiency). These differences provide further support for using both as gauges of risk in the firm's operating environment.

Differences Between Top and Bottom Two Deciles. Except for Total Compensation and CEO-chair Duality which are almost equal (p=.06 and .09 respectively) there are striking

differences in all variables between the top and bottom two deciles (all p-values of differences in means <.01, see Table 2a). As expected, the top two deciles have lower Book-to-Market ratios (reflecting greater market value growth along with the volatility). Though the two groups pay almost the same Total Compensation (about $1.74 and $1.8 for the top and bottom two deciles respectively), the top deciles of volatility pay a greater proportion in variable pay (about 73% versus 56%) likely reflecting the larger market values; Book-to-Market is much lower for the top two deciles, and growing firms tend to pay greater proportion in equity in part to align executive and shareholder interests and sometimes to attract top talent in spite of cash constraints. Furthermore, their relatively higher market values can help reduce the risk premium (e.g., Hall and Murphy 2002 and 2003) associated with stock-based compensation. Less risky firms (bottom two deciles) are larger both by Total Assets and Market value.

Differences Between CEOs and Non-CEOs. Table 2b shows the differences in means and medians for CEOs and non-CEO top executives. While all the compensation and position related variables are significantly different between the two groups, there is no significant difference between the two groups in almost all the company-level variables.

The correlations among the primary variables are in Table 3. Unsurprisingly the correlation amongst the compensation variables are high. While most other correlations are significant at the .05 level, they tend to be small.

Multivariate Results

I first present the results of the pay-performance measure relations across all sorting of volatility measures before turning to presenting the results of the control variables, especially since the

control variables behave similarly across all the different sorting of the risk measures[4].

Sorting on SDV (CFO / NOA) with ROA as Performance Measure. The results of estimating Equation 1 based on a sorting of the standard deviation (SDV) of Cash Flow from Operations / Average Net Operating Assets SDV (CFO / Avg NOA) are in Table 4. The first three columns reflect Total Pay as the dependent variable for the Bottom 2, Middle 6, and Top 2 deciles of SDV (CFO/NOA) respectively. The next three columns reflect the Fixed Pay component of Total Pay, and the last three, the Variable Pay component.

The insights from the univariate analysis are partly borne out here. For Total Pay, there is a monotonic decline in the pay-performance relation as measured by ROA as volatility increases (for all executives), though the incremental decline for executives who are CEOs as volatility increases is not monotonic (see Figure 1a). The decline in the pay-performance relation as volatility increases comes from both fixed and variable pay for all top executives (The ROA variable declines across the board in Table 4; also see Figures 1b and 1c).

Being the CEO increases an executive's Total Pay significantly. Interestingly, when risk in the environment is low (the Bottom 2 deciles), most of the incremental CEO pay is variable while for more risky firm environments (Middle 6 and Top 2 deciles), incremental pay for being CEO come in the form of Fixed Pay (see the Executive is CEO variable in Table 4).

The diagrammatic presentation of incremental CEO compensation for fixed and variable is more interesting. Most CEOs (Middle 6 deciles) get most of their incremental compensation in Fixed Pay – incremental variable pay is 40% for this group (see Figure 1b, c, and d.) Also, there is a strong relation between ROA and Fixed Pay for this group while the relation between ROA and Variable Pay is insignificant.

[4] All models are estimated with White-corrected robust standard errors, significantly mitigating concerns about heteroskedasticity (e.g., Greene 2003).

Figures 1b, c, and d suggest that variable pay is a large component of incremental pay for executives who are CEOs in the Bottom 2 and Top 2 deciles of cash flow volatility (though only the Bottom 2 is significant in Table 4). The incremental pay percentages for the Bottom 2 and Top 2 deciles of volatility are 80% and about 83% respectively composed of variable pay.

Basing a large component of a CEO's compensation on variable pay when risk in the operating environment is low is consistent with agency theory (e.g. Bolton and Dewatripont 2005). Basing more than 80% of a CEO's incremental pay on variable pay when risk in the environment is high can also be consistent with self-selection where less risk averse CEOs seek out firms that pay more in variable pay. Another contributing factor is that firms in the top two deciles of volatility are growth firms (low book-to-market), smaller, and riskier (higher Z-scores). Therefore, they are more likely to face cash constraints that can compel them to offer more stock-based compensation.

Sorting on SDV (CFO / NOA) with Cumulative Annual Returns as Performance Measure. Table 5 shows the results of estimating the model with Cumulative Annual Return as the performance measure conditional on risk in cash flows. With market returns as the performance measure, it appears that most executives are protected from market reaction to performance. This is evidenced in the negative or insignificant coefficient on Cumulative Annual Return.

This result suggests that firms attempt to meet executives' reservation wages and utilities in spite of market reaction to the actions they take. This is consistent with an agency theoretic setting where the principal attempts to balance incentives with risk sharing, knowing that the agent taking a good action can still result in a bad outcome. While Holmstrom's informativeness principle argues that all information that can provide insight on the manager's actions should be used in evaluating the manager, by the same token, information that does not inform on the manager's actions or effort should be excluded as such information only add noise (Holmstrom 1979, Holmstrom and Milgraom 1987). Thus,

conditional on volatility in cash flows, it is possible that returns are a noisy measure that firms may ignore in the compensation setting process. As a practical example, an executive can make investments that can cause volatility in current or near-term cash flow but not affect returns till several years hence.

Even for executives who are CEOs the incremental pay for the Middle 6 and Top 2 deciles of volatility come from fixed pay. It is only for the Bottom 2 deciles of volatility that the incremental pay for CEOs come from Variable Pay, consistent with treating CEOs as largely risk averse.

Sorting on SDV of Cumulative Annual Returns with ROE as Performance Measure (results in Table 6). Having ROE as the performance measure implies that top executives are being evaluated on their performance for shareholders, not necessarily for all capital providers. The pay-performance relation for top executives declines monotonically from the Bottom 2 to the Top 2 deciles for Total Pay, Fixed Pay, and Variable Pay for all executives (See the Return on Equity variable in Table 6). This result again is consistent with agency theory in that the principal partially shields the agent from variability in compensation as risk in the firm's environment increases.

However, for CEOs, the incremental pay-performance relation is increased conditional on the risk in the market returns. While in terms of Total Pay, the increase in the performance-pay relation appears monotonic (see Executive is CEO in first three columns of Table 6), there are important differences in how the increase is distributed conditional on risk in market returns. For the Bottom 2 deciles, almost all the incremental pay from being a CEO comes from Fixed Pay, suggesting that this may be the most risk-averse CEOS. For the Middle 6 deciles, about 34% of the incremental pay for being CEO comes from Fixed Pay. Though only about 29% of the incremental pay for being CEO comes from fixed pay for the Top 2 deciles of SDV of returns, both the fixed and variable components are almost insignificant ($p<.10$), suggesting that performance-pay relation for CEOs is weakened as

risk increases. Again, these results are consistent with agency theory assuming a risk averse CEO.

Interestingly, except for the Middle 6 deciles, top executives in general get a larger portion of their total pay in variable form than do CEOs. For top executives in general, it is about 60%, 59.4% and 60% for the Bottom 2, Middle 6 and Top 2 deciles respectively. The corresponding ratios for CEOs on the other had are 32%, 64% are 53% respectively. Again, this may reflect differences in bargaining power between CEOs and other top executives, self-selection of *highly* risk averse CEOs into *low* risk firm environments, and *less* risk averse CEOs into environments that offer relatively *more* risk and potential reward or more likely, a combination of the two.

These patterns are presented diagrammatically in figures 2a – 2d. Besides the possibility of non-CEOs having lower bargaining power in their compensation setting processes, it is also possible that non-CEO top executives tend to have lower levels of risk aversion and are willing to challenge themselves more in their quest to reach the corner office. This ambition may compel some of them to take more variable pay to motivate themselves and to show that they "have what it takes" to be CEO.

Control Variables. Across all models, Book-to-Market is negatively related to compensation, reflecting the fact that high market value firms tend to pay their top executives more, though the amount generally decreases as risk increases. I control for the quality of the executive's output with the Modified Jones Model Discretionary Accruals (Jones 1991 and Dechow et al. 1995). Negative discretionary accruals are income decreasing and positive ones are income increasing. The significant coefficients suggests that boards of directors tend to incorporate the quality of income into compensation decisions, though the small coefficients suggest their effects on compensation are not very large. The negative sign on the coefficients imply that income decreasing discretionary accruals are likely interpreted as higher quality income and rewarded and vice-versa. Executives are able to increase their total compensation by levering up their capital structure. They reap the

benefits of leverage primarily through Fixed Pay. Losses are generally negatively associated with compensation, but the effects are quite small for CEOs.

Interestingly, financial distress (measured by Zmijewski's Z-score (Zmijewski 1984) is incrementally positively related to Variable Pay for the Middle 6 and Top 2 deciles of risk. This could be related to valuable equity and options-based offers made to attract executives to distressed companies or induce them to stay.

The only systematic pattern between CEO-Chair Duality and compensation emerges when risk is measured in terms of market returns (Table 6). In the Bottom 2 and Middle 6 deciles of risk, CEOs who are also chairs of the board command significantly higher premia for being chairs and the incremental pay decreases in risk. This suggests some level of self-selection with the most risk averse CEOs going to firms with lower risk in market returns or CEOs using their positions as chairs of the board to extract rents from shareholders. It is also possible that CEOs who are also chairs of the board are just being paid to do more work as the firms with less risk also tend to be larger (e.g., Baker and Hall 2004).

Sensitivity Tests with Current and Non-Current Pay

In sensitivity tests in which the dependent variable is alternately Current Pay (salary and bonus, i.e., cash pay) and Non-Current Pay (largely deferred stocks and options), the tenor of the general results holds with the following exceptions. Executives' Current Pay is positively related to Cumulative Annual Returns in a monotonically decreasing fashion as cash flow risk increases. However, they are protected from market effects on their stock- and option-related pay as the relation between Cumulative Annual Returns and Non-current Pay is negative, with the largest "protection" (i.e., largest negative coefficient) on the Bottom 2 declines of cash flow risk (see Table 7).

A diagrammatic presentation of the coefficients on Cumulative Annual Return for All Executives and for Executive is CEO for both Current Pay and Non-current Pay is presented in Figure 3a and 3b. This result is also consistent with the principal

shifting compensation from the relatively more variable stocks and options to the more stable salary and bonus as risk in the operating environment increases. The larger Current Pay coefficients as volatility in cash flows decline reinforces the possibility of some extent of self-selection of top executives into firms depending on their level of risk aversion. Since the results of the other sorting of the data are very similar to those presented previously, I do not present them.

Sensitivity Tests with the Middle 6 Deciles

It is possible that firms systematically set compensation contracts for most top executives conditional on the volatility in the outputs of the firm's operating environment. If so, examining the "hold out" sample of the middle six deciles will exhibit a systematic pattern of results consistent with agency theory such as declining relation between pay and performance as volatility increases. On the other hand if only firms in situations of extreme volatility devote significant effort to structuring the components of pay (e.g., more fixed or current pay relative to variable or non-current pay in high volatility settings) then there will be no systematic pattern observed when the Middle 6 deciles are examined in greater detail.

To test this, I re-estimate the models but for only the Middle 6 deciles of volatility. The only result that displays a systematic pattern that can be interpreted as a consistent with agency theory is the regression of Current Pay on ROA and control variables, conditional on volatility in cash flows (i.e., sorted on SDV (CFO/Avg NOA)). This suggests that firms likely exert more effort in designing compensation contracts in extreme settings of volatility compared to moderate volatility settings. The results of examining the Middle 6 deciles in greater detail suggests that in non-extreme volatility situations (i.e., moderate volatility) firms focus on linking the Current Pay component of compensation with a broad accounting measure like ROA and de-emphasize other measures**.** There is an almost monotonic decline in the relation between Current Pay and ROA as volatility in cash flows increases

(see Table 8). Since current pay is composed of only salary and bonus, it appears that companies do not systematically calibrate volatility in cash flows and stock prices into their stocks and options-based compensation contracts in moderate volatility settings.

In turn, the relative exclusion of stock and stock-related compensation in non-extreme volatility settings may be contributing to the notion of managerial power and rent extraction in both academic scholarship on top executive compensation and in the popular press (e.g., Bebchuk 2009, Bebchuk and Fried 2002, and Desai 2012).

5. DISCUSSION AND CONCLUSION

This paper tests agency theory's efforts to explain how managerial compensation should be set conditional on the risk in the operating environment and assuming the manager is risk averse. It is a difficult problem since managerial actions are not fully observable and so she has to be incentivized to take the desired actions. The need to provide the manager with incentives often means providing her with variable pay which is less desirable the more risk averse the manger is (e.g., Hall and Murphy 2002)**.** The results of the paper suggest that companies attempt to strike this balance and while they largely succeed in striking a good balance between providing incentives and meeting the manager's reservation wage and utility, imperfections in the contracting process (for example, unobservable managerial actions) and differences in bargaining power can allow some CEOs to collect rents (e.g., Bebchuck and Fried 2002 and Morse et al. 2011).

This could be what is reflected in the significantly large incremental compensation for being chair of the board in a firm with low risk even as some non-CEO executives share more risk than may be commensurate with their level of risk aversion. For example, when volatility in stock returns is the measure of risk in the operating environment non-CEO top executives tend to have a greater share of their income in variable pay than CEOs (see Figure 2d, which is derived from Table 6)

Another potential contributor to the notion of inefficient top executive compensation is that in moderate volatility settings, companies seem to not deliberately structure the components of compensation to reflect operating risk as they do in extreme volatility settings.

Further research that examines the pay setting process of non-CEO top executives and what motivates them can be fruitful. For example, is it possible non-CEO top executives assume more challenge / risk as a way to demonstrate their suitability for the top job? Also, research that investigates if and how firms deliberately consider and / or incorporate volatility in the operating environment into compensation design can be very informative. To this end Graham et al. (2012) present interesting research in the context of CEOs (as opposed to all top executives) that points to individual CEO "fixed effects" playing a much larger role in determining compensation. However, Fee et al. (2013) contend that most of Graham et al.'s results can be explained by exogenous CEO changes. That is, when top-performing CEOs voluntarily leave the firm, the firm tends to continue with the existing strategy leaving CEO "fixed effects" to account for a much smaller component of CEO compensation.

Research that examines the extent, if any, that significant components of compensation like pensions and severance packages that are seemingly unlinked to performance are negotiated can also enhance researchers and regulators' understanding of the top executive pay setting process.

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Appendix

1. Estimation of Cumulative Annual Return (CAR)

$RET = (SP_{END} / SP_{BEG}) - 1$

Where

RET = Monthly returns

SP_{END} = Stock price at the end of the month

SP_{BEG} = Stock price at the beginning of the month

$CAR = EXP (\ln\sum(1 + RET)) - 1$, where the summation is over the 12 months spanning each firm's fiscal year.

Standard deviations are measured using the prior five years' CARs.

2. Calculation of Net Operating Assets (NOA)

Total Operating Assets = Total Assets – Cash – Marketable Securities – Cash Equivalents

Total Operating Liabilities = Total Liabilities – Long Term Debt – Short Term Debt

Net Operating Assets (NOA) = Total Operating Assets – Total Operating Liabilities

Standard deviations are calculated using the prior five years' (CFO / Average NOA).

$Average\ NOA = (NOA_{END} + NOA_{BEG}) / 2$

Where

NOA_{BEG} = Beginning NOA

NOA_{END} = Ending NOA

3. Estimation of Discretionary Accruals (DISC-ACCRUAL)

Discretionary accruals are estimated using the Modified Jones Model proposed by Dechow et al. (1995).

$TACC_t = \alpha + \beta_1(\Delta REV_t - \Delta REC_t) + \beta_2 PPE_t + \varepsilon_t$

Where

TACC = Total Accrual, measured as Net Income – Cash Flow from Operations

ΔREV = Change in Revenue from the prior year

ΔREC = Change in Accounts Receivables from the prior year
PPE = Property, Plant and Equipment
ε = Error term (residuals) representing the measure of discretionary accruals.
The model is estimated at the 2-digit SIC code level and I require there to be at least nine observations per SIC code to enter the sample.

4. Background on Compensation Variables

Total Compensation (called TDC1 in Execucomp) = Salary + Bonus + Other Annual Compensation + Restricted Stock Grants + Long Term Incentive Payment Payouts + All Other + Value of Option Grants.
Non-current Pay = Black Scholes value of stock option awards + stock awards
Current Pay = Salary + Bonus
Variable Pay = Non-current Pay + stock option awards
Other Fixed Pay = Total Compensation – Variable Pay – Salary
Total Fixed Pay = Salary + Other Fixed Pay

Table 1: Descriptive Statistics - Primary Variables

	Mean	1st Quartile	Median	3rd Quartile	Std. Dev.
Total Compensation (Thousands)	$1675.82	$444.93	$849.11	$1784.24	$2465.48
Return on Assets	0.05	0.01	0.06	0.10	0.13
Return on Equity	0.07	0.03	0.12	0.19	0.34
Cumulative Annual Return	0.17	-0.15	0.10	0.38	0.54
Book-to-Market	0.49	0.25	0.41	0.62	0.39
Discretionary Accruals (Millions)	$-120.70	$-104.78	$-14.50	$21.93	$452.63
Zmijewski's Z-score	5.29	2.44	3.79	5.96	5.55
Total Fixed Pay (Thousands)	$615.64	$233.31	$358.60	$634.40	$811.64
Total Variable Pay (Thousands)	$1017.65	$144.60	$402.03	$1035.55	$1826.31
Total Current Pay (Thousands)	$606.57	$275.00	$431.25	$721.59	$545.29
Total Non-current Pay (Thousands)	$742.08	$0.00	$201.17	$697.82	$1543.56
Leverage (Debt / Assets)	0.26	0.09	0.25	0.39	0.20
Average Assets (Millions)	$3,013.01	$328.13	$817.83	$2,383.14	$6,546.61
Market Value	$4,028.96	$381.41	$951.36	$2,960.86	$9,654.44
Loss Year	0.20	0.00	0.00	0.00	0.40
CEO-chair Duality	0.18	0.00	0.00	0.00	0.38
Std Dev of CFO / Avg NOA	0.10	0.01	0.02	0.05	0.31
Std Dev. of Cumulative Annual Returns	0.48	0.20	0.35	0.59	0.46
N	76,009				

Table 2a: Mean and Median Differences of Top and Bottom Deciles

	Mean (Top 2 Deciles)	Mean (Bottom 2 Deciles)	p-value	Median (Top 2 Deciles)	Median (Bottom 2 Deciles)	p-value
Total Compensation (Thousands)	$1,737.00	$1,798.01	0.06	$811.28	$948.47	0.00
Return on Assets (Millions)	0.02	0.05	0.00	0.06	0.05	0.00
Return on Equity	0.02	0.10	0.00	0.12	0.12	0.49
Cumulative Annual Return	0.20	0.15	0.00	0.06	0.11	0.00
Book-to-Market	0.38	0.53	0.00	0.29	0.45	0.00
Discretionary Accruals (Millions))	$-64.89	$-190.36	0.00	$-5.87	$-30.36	0.00
Zmijewski's Z-score	7.16	4.00	0.00	4.81	3.19	0.00
Total Fixed Pay (Thousands)	$465.38	$769.93	0.00	$288.64	$444.04	0.00
Total Variable Pay (Thousands)	$1,210.15	$983.59	0.00	$433.95	$415.89	0.03
Total Current Pay (Thousands)	$506.93	$701.77	0.00	$365.47	$515.11	0.00
Total Non-current Pay (Thousands)	$969.36	$666.34	0.00	$263.82	$187.60	0.00
Leverage (Debt / Assets)	0.19	0.33	0.00	0.10	0.33	0.00
Average Assets (Millions)	$1,333.38	4743.26	0.00	$399.37	$1,534.30	0.00
Market Value (Millions)	$2,763.31	$5567.15	0.00	$690.47	$1,517.06	0.00
Loss Year	0.29	0.14	0.00	0.00	0.00	0.00
CEO-chair Duality	0.17	0.18	0.09	0.00	0.00	0.09
Std. Dev of CFO / Avg. NOA	0.44	0.01	0.00	0.17	0.01	0.00
Std. Dev. of Cumulative Annual Returns	0.70	0.33	0.00	0.51	0.25	0.00
n	13,013	13,361		13,013	13,361	

Table 2b: Mean and Median Differences of CEO and Non-CEO Executives

	Mean (CEOs)	Mean (Non-CEOs)	p-value	Median (CEOs)	Median (Non-CEOs)	p-value
Total Compensation (Thousands)	$3,406.14	$1,306.32	0.00	$1,954.87	$730.08	0.00
Return on Assets	0.05	0.05	0.21	0.06	0.06	0.13
Return on Equity	0.08	0.07	0.13	0.12	0.12	0.06
Cumulative Annual Return	0.16	0.18	0.01	0.09	0.10	0.30
Book-to-Market	0.49	0.49	0.92	0.41	0.41	0.94
Discretionary Accruals (Millions)	$-126.70	$-119.42	0.09	$-15.99	$-14.19	0.02
Zmijewski's Z-score	5.30	5.29	0.93	3.77	3.79	0.48
Total Fixed Pay (Thousands)	$1,129.02	$506.02	0.00	$687.00	$318.15	0.00
Total Variable Pay (Thousands)	$2,141.94	$777.56	0.00	$1049.75	$340.09	0.00
Total Current Pay (Thousands)	$1,106.63	$499.79	0.00	$855.21	$383.52	0.00
Total Non-current Pay (Thousands)	$1,553.74	$568.76	0.00	$574.03	$172.38	0.00
Leverage (Debt / Total Assets)	0.26	0.26	0.34	0.25	0.25	0.18
Average Assets (Millions)	$3,137.48	$2,986.43	0.02	$865.85	$808.58	0.00
Market Value (Millions)	$4,253.88	$3,980.92	0.00	$1,033.95	$934.00	0.00
Loss Year	0.19	0.20	0.06	0.00	0.00	0.06
CEO-chair Duality	1.00	0.00	0.00	1.00	0.00	0.00
Std. Dev of CFO / Avg. NOA	0.09	0.10	0.48	0.02	0.02	0.06
Std. Dev. of Cumulative Annual Returns	0.47	0.48	0.06	0.34	0.35	0.12
N	13,375	62,634		13,375	62,634	

Table 3, Firm Performance and Top Executives' Pay: Correlation of Primary Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Total Compensensationn, 1	1																	
Return on Assets, 2	0.08**	1																
Return on Equityy, 3	0.07**	0.62**	1															
Cum. Annual Return, 4	0.01**	0.16**	0.11**	1														
Book-to-Market, 5	-0.15**	-0.20**	-0.15**	-0.23**	1													
Discretionary Accruals, 6	-0.33**	0.10**	0.06**	0.03**	.08**	1												
Zmijewski's Z-score, 7	0.06**	0.36**	0.17**	0.19**	-0.29**	0.08**	1											
Total Fixed Pay, 8	0.66**	0.05**	0.07**	0	-0.08**	-0.31**	-0.10**	1										
Total Variable Pay,9	0.93**	0.08**	0.06**	0.01**	-0.16**	-0.27**	0.12**	0.38**	1									
Total Current Pay, 10	0.66**	0.14**	0.14**	0.03**	-0.14**	-0.32**	-0.05**	0.61**	0.57**	1								
Total Non-current Pay, 11	0.87**	0.05**	0.04**	0	-0.15**	-0.24**	0.13**	0.30**	0.97**	0.41**	1							
Leverage (Deb / Assets), 12	0.02**	-0.20**	-0.09**	.07**	.04**	-0.12**	-0.53**	0.14**	-0.03**	0.12**	-0.05**	1						
Average Assets, 13	0.38**	0.03**	0.07**	-0.03**	-0.07**	-0.74**	-0.11**	0.42**	0.300**	0.44**	0.24**	0.19**	1					
Market Value, 14	0.44**	0.15**	0.14**	0.02**	-0.21**	-0.60**	0.10**	0.36**	0.40**	0.43**	0.35**	0.01	0.79**	1				
Loss Year, 15	-0.06**	-0.68**	-0.51**	-0.13**	0.21**	-0.09**	-0.18**	-0.07**	-0.05**	-0.15**	-0.01**	0.11**	-0.06**	-0.12**	1			
CEO-chair Duality, 16	0.32**	0.01	0.01	-0.01*	0	-0.01	0	0.29**	0.28**	0.42**	0.24**	0	0.01*	0.01**	-0.01	1		
SDV of CFO / NOA, 17	0.03**	-0.10**	-0.06**	0.01**	-0.09**	0.03**	0.08**	-0.04**	0.05**	-0.03**	0.06**	-0.08**	-0.06**	-0.01**	0.08**	0	1	
SDV. of Cum. Annual Ret, 18	0.02**	-0.05**	-0.06**	-0.01	0.06**	0.06**	0.14**	0.14**	-0.10**	0.06**	-0.10**	0.08**	-0.14**	-0.09**	0.10**	-0.01	0.15**	1

p-values in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Relation Between Firm ROA and Executives' Total, Fixed, and Variable Pay Respectively SDV of CFO-to-Avg NOA Sort)

Dependent Variable:	Total Pay			Fixed Pay			Variable Pay		
Deciles of Volatility:	Bottom 2	Middle 6	Top 2	Bottom 2	Middle 6	Top 2	Bottom 2	Middle 6	Top 2
Intercept	522.851	478.052**	260.330	248.801	346.115***	237.908***	335.791	175.152	36.482
	(0.118)	(0.034)	(0.528)	(0.211)	(0.000)	(0.000)	(0.143)	(0.237)	(0.915)
Return on Assets	3395.569**	1991.597***	956.660***	1422.725***	730.572***	249.565***	1893.645*	1203.586***	685.352***
	(0.011)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.086)	(0.000)	(0.008)
Executive is CEO	1997.032**	1501.419***	1588.269*	324.572	645.948***	204.828***	1652.912**	577.083	1376.988
	(0.013)	(0.005)	(0.094)	(0.303)	(0.008)	(0.002)	(0.019)	(0.123)	(0.147)
Book-to-Market	-713.783***	-624.163***	-526.177***	-151.687***	-117.255***	-53.567**	-540.714***	-499.526***	-436.535***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.027)	(0.000)	(0.000)	(0.000)
Discretionary Accruals	-1.570***	-1.682***	-1.994***	-0.585***	-0.512***	-0.272***	-0.889***	-1.057***	-1.470***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage (Debt / Assets)	661.097*	351.335**	637.547**	203.867*	260.964***	220.745***	412.612	52.407	398.296*
	(0.067)	(0.044)	(0.017)	(0.093)	(0.000)	(0.001)	(0.157)	(0.690)	(0.090)
Loss Year	44.992	-26.567	-173.987	0.015	-40.688**	-15.164	45.639	10.430	-128.316
	(0.765)	(0.675)	(0.118)	(1.000)	(0.049)	(0.580)	(0.701)	(0.829)	(0.172)
Zmijewski's Z-score	-25.493	9.731	28.550***	-22.439***	-15.218***	-4.672***	-4.487	20.402**	29.455***
	(0.173)	(0.401)	(0.009)	(0.000)	(0.000)	(0.002)	(0.776)	(0.039)	(0.001)
CEO-chair Duality	342.147	520.604	294.881	470.507	-43.142	233.532***	-242.385	747.392**	-78.149
	(0.670)	(0.334)	(0.757)	(0.135)	(0.860)	(0.001)	(0.731)	(0.047)	(0.935)
Sector & Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	13361	49635	13013	13361	49635	13013	13361	49635	13013
Adj R-squared	0.356	0.273	0.232	0.339	0.245	0.195	0.269	0.229	0.215

p-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All models are estimated with robust standard errors.

Table 5: Relation Between Firm Returns and Executives' Total, Fixed, and Variable Pay Respectively (SDV

of CFO-to-Avg NOA Sort)

Dependent Variable:	Total Pay			Fixed Pay			Variable Pay		
Deciles of Volatility:	Bottom 2	Middle 6	Top 2	Bottom 2	Middle 6	Top 2	Bottom 2	Middle 6	Top 2
Intercept	887.603**	523.942**	257.162	382.853*	362.644***	234.581***	555.948***	205.541	36.029
	(0.011)	(0.015)	(0.490)	(0.085)	(0.000)	(0.000)	(0.008)	(0.143)	(0.907)
Cumulative Annual Return	-213.142**	-15.905	-59.227	20.971	-4.777	17.258	-217.183***	-18.819	-66.194
	(0.012)	(0.628)	(0.288)	(0.464)	(0.561)	(0.154)	(0.001)	(0.485)	(0.169)
Executive is CEO	1955.255**	1358.819***	1636.063*	317.641	593.837**	224.520***	1620.187**	489.171	1405.980
	(0.019)	(0.009)	(0.078)	(0.317)	(0.017)	(0.001)	(0.025)	(0.160)	(0.133)
Book-to-Market	-846.125***	-660.169***	-521.392***	-181.222***	-130.206***	-41.502*	-637.624***	-523.529***	-440.967***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.096)	(0.000)	(0.000)	(0.000)
Discretionary Accruals	-1.551***	-1.661***	-1.973***	-0.581***	-0.505***	-0.269***	-0.875***	-1.044***	-1.454***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage (Debt / Assets)	568.051	331.560*	647.062**	161.977	253.689***	223.881***	363.312	40.638	404.638*
	(0.118)	(0.059)	(0.016)	(0.181)	(0.000)	(0.001)	(0.210)	(0.759)	(0.084)
Loss Year	-341.339***	-338.256***	-484.424***	-151.412***	-154.930***	-94.162***	-179.122**	-178.752***	-352.157***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.015)	(0.000)	(0.000)
Zmijewski's Z-score	-2.468	22.274**	33.968***	-13.527***	-10.629***	-3.741**	9.008	28.085***	33.687***
	(0.887)	(0.045)	(0.002)	(0.000)	(0.000)	(0.019)	(0.542)	(0.003)	(0.000)
CEO-chair Duality	383.974	664.509	245.276	477.744	9.458	213.858***	-209.887	835.997**	-108.793
	(0.646)	(0.201)	(0.793)	(0.132)	(0.970)	(0.002)	(0.772)	(0.017)	(0.908)
Sector & Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	13361	49635	13013	13361	49635	13013	13361	49635	13013
Adj R-squared	0.352	0.270	0.230	0.334	0.242	0.193	0.268	0.226	0.214

p-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All models are estimated with robust standard errors. Table 6: Relation Between Firm ROE and Executives' Total, Fixed, and Variable Pay Respectively (SDV of Returns Sort)

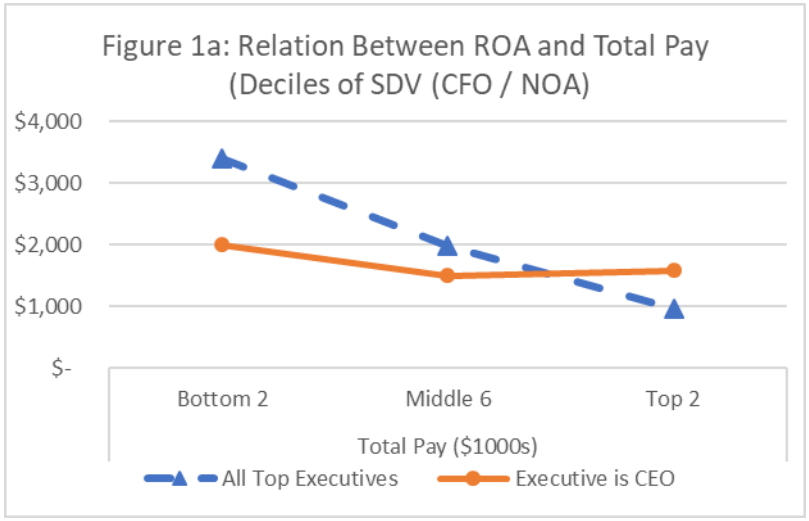
Dependent Variable:	Total Pay			Fixed Pay			Variable Pay		
Deciles of Volatility:	Bottom 2	Middle 6	Top 2	Bottom 2	Middle 6	Top 2	Bottom 2	Middle 6	Top 2
Intercept	1034.132***	288.704	645.608***	396.246***	318.105***	278.471***	637.992***	31.066	367.388**
	(0.000)	(0.269)	(0.001)	(0.000)	(0.009)	(0.000)	(0.000)	(0.848)	(0.020)
Return on Equity	441.947***	391.502***	297.185**	148.821***	134.698***	95.417***	266.010**	232.806***	177.626*
	(0.003)	(0.000)	(0.020)	(0.001)	(0.000)	(0.005)	(0.015)	(0.000)	(0.076)
Executive is CEO	390.373**	892.708***	3380.216***	304.034**	306.336***	951.558*	75.258	590.033**	1768.357*
	(0.035)	(0.006)	(0.001)	(0.020)	(0.001)	(0.084)	(0.763)	(0.045)	(0.072)
Book-to-Market	-825.908***	-584.789***	-653.428***	-175.886***	-119.555***	-51.653*	-642.925***	-458.382***	-559.911***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.051)	(0.000)	(0.000)	(0.000)
Discretionary Accruals	-1.377***	-1.703***	-2.039***	-0.469***	-0.564***	-0.345***	-0.839***	-1.008***	-1.511***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage (Debt / Assets)	44.928	439.377**	693.650***	21.478	257.297***	303.832***	13.650	151.020	341.605
	(0.872)	(0.010)	(0.005)	(0.810)	(0.000)	(0.000)	(0.951)	(0.243)	(0.108)
Loss Year	-196.398**	-299.697***	-112.318	-115.200***	-116.130***	-43.067	-73.143	-171.634***	-90.643
	(0.031)	(0.000)	(0.274)	(0.000)	(0.000)	(0.116)	(0.295)	(0.000)	(0.278)
Zmijewski's Z-score	-10.480	17.788*	35.735***	-18.071***	-11.408***	-3.974***	5.726	25.612***	33.972***
	(0.427)	(0.056)	(0.002)	(0.000)	(0.000)	(0.002)	(0.585)	(0.001)	(0.000)
CEO-chair Duality	1742.715***	1142.192***	-1330.743	400.541***	323.353***	-491.288	1236.849***	720.193**	-330.069
	(0.000)	(0.000)	(0.187)	(0.003)	(0.001)	(0.370)	(0.000)	(0.015)	(0.738)
Sector & Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	14334	45713	15962	14334	45713	15962	14334	45713	15962
Adj R-squared	0.322	0.282	0.244	0.288	0.270	0.180	0.261	0.222	0.233

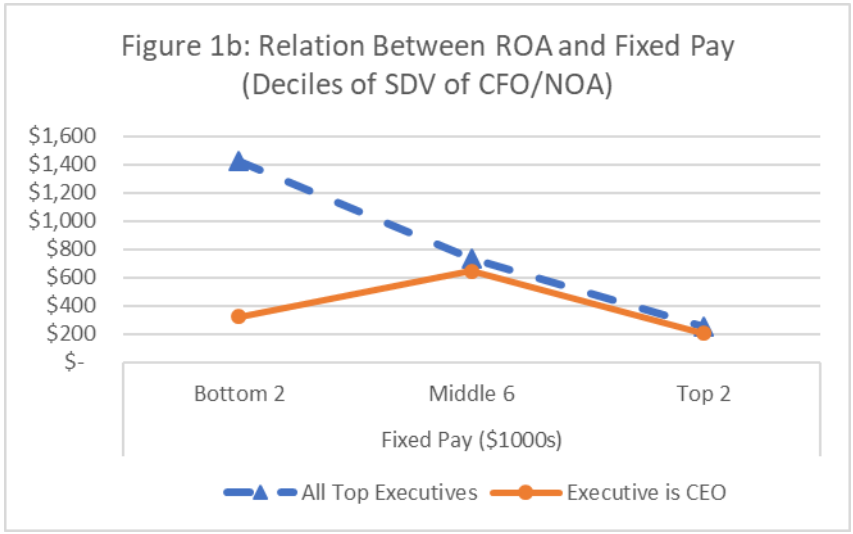
p-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All models are estimated with robust standard errors, mitigating concerns about heteroskedasticity.

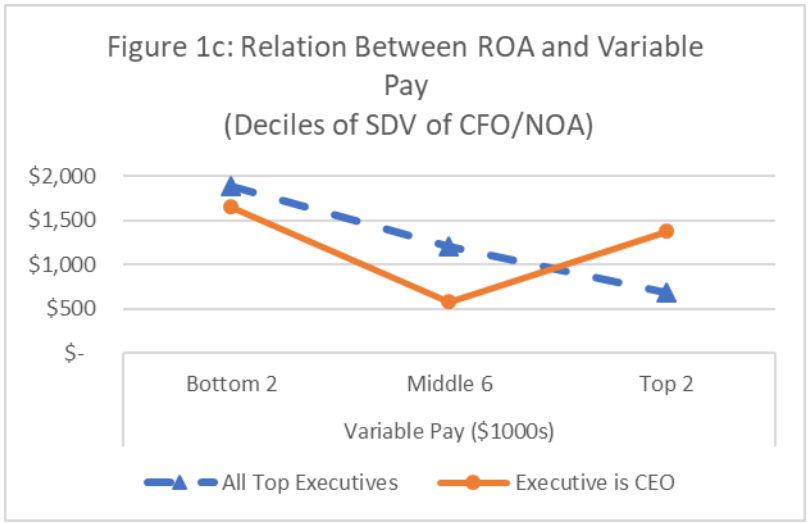
Table 7: Relation Between Firm Returns and Executives' Current Non-current Pay Respectively (SDV of CFO-to-Avg NOA Sort)

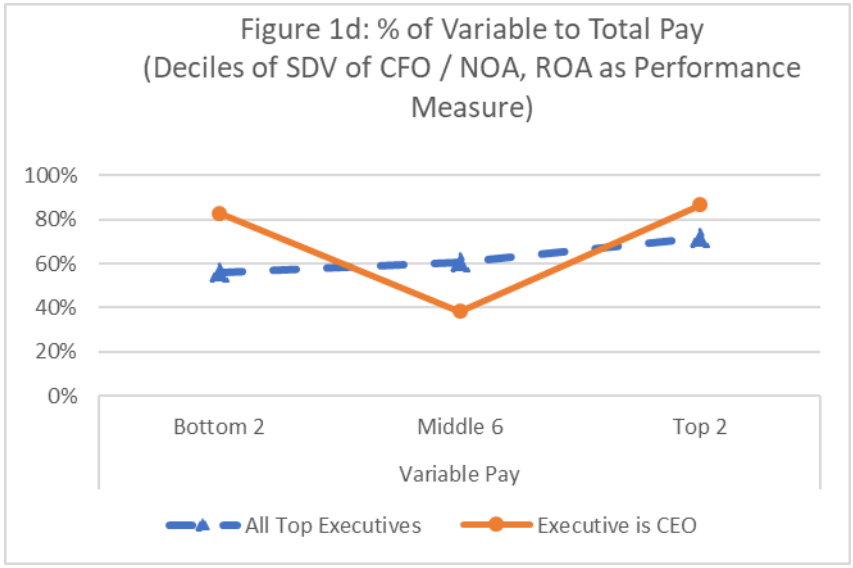
Dependent Variable:	Current Pay			Non-current Pay		
Deciles of Volatility:	Bottom 2	Middle 6	Top 2	Bottom 2	Middle 6	Top 2
Intercept	790.049***	501.293***	299.196***	112.632	31.966	-35.025
	(0.000)	(0.000)	(0.000)	(0.524)	(0.786)	(0.894)
Cumulative Annual Return	42.484**	27.083***	21.174**	-256.719***	-56.020**	-78.144*
	(0.012)	(0.000)	(0.014)	(0.000)	(0.018)	(0.080)
Executive is CEO	597.642	396.674***	251.928*	1093.166	419.689	1366.978
	(0.161)	(0.000)	(0.067)	(0.137)	(0.213)	(0.152)
Book-to-Market	-191.289***	-154.053***	-64.364***	-477.816***	-405.526***	-373.287***
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)
Discretionary Accruals	-0.357***	-0.366***	-0.286***	-0.625***	-0.768***	-1.164***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage (Debt / Assets)	139.152	153.506***	188.655***	321.140	-33.270	280.966
	(0.111)	(0.000)	(0.000)	(0.197)	(0.763)	(0.188)
Loss Year	-177.972***	-202.844***	-196.139***	-56.662	-27.576	-203.915**
	(0.000)	(0.000)	(0.000)	(0.374)	(0.351)	(0.010)
Zmijewski's Z-score	-9.486***	-7.090***	-0.824	13.922	29.031***	30.712***
	(0.003)	(0.000)	(0.671)	(0.262)	(0.000)	(0.000)
CEO-chair Duality	104.640	210.123**	197.379	-112.241	531.512	-376.360
	(0.805)	(0.018)	(0.149)	(0.879)	(0.116)	(0.694)
Sector & Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	13361	49635	13013	13361	49635	13013
Adj R-squared	0.452	0.388	0.310	0.210	0.188	0.198

p-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All models are estimated with robust standard errors, mitigating concerns about heteroskedasticity.

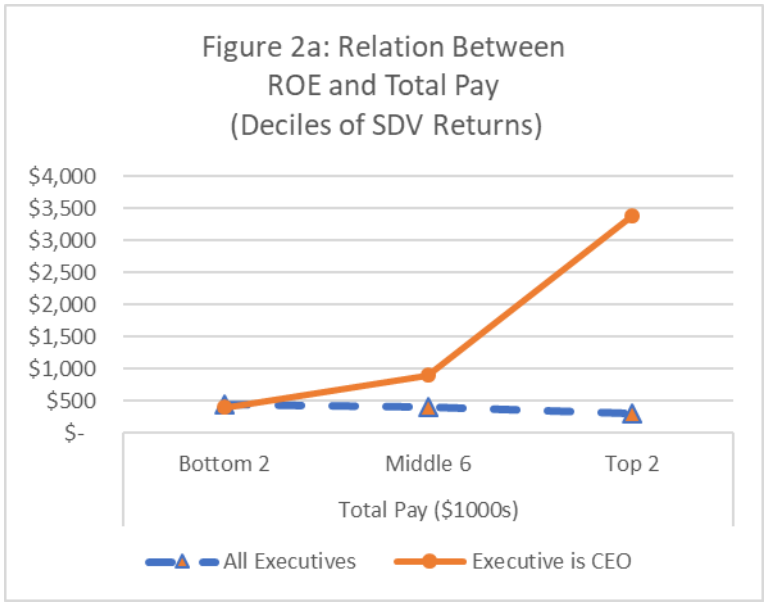


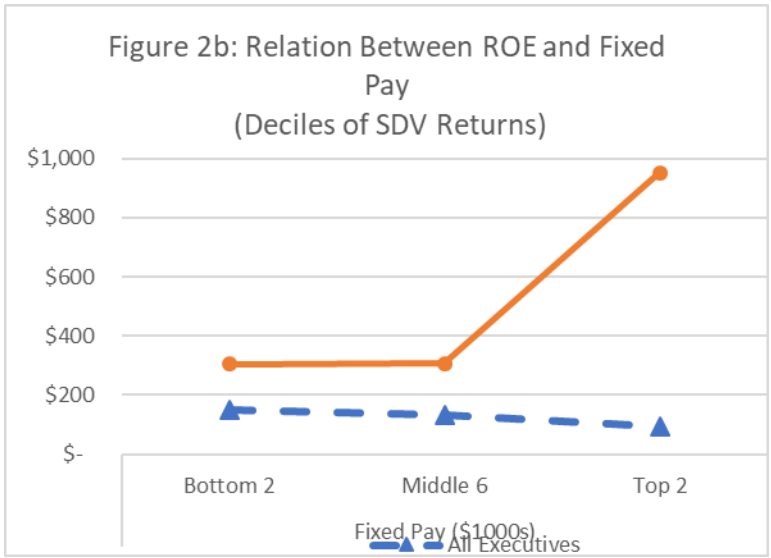


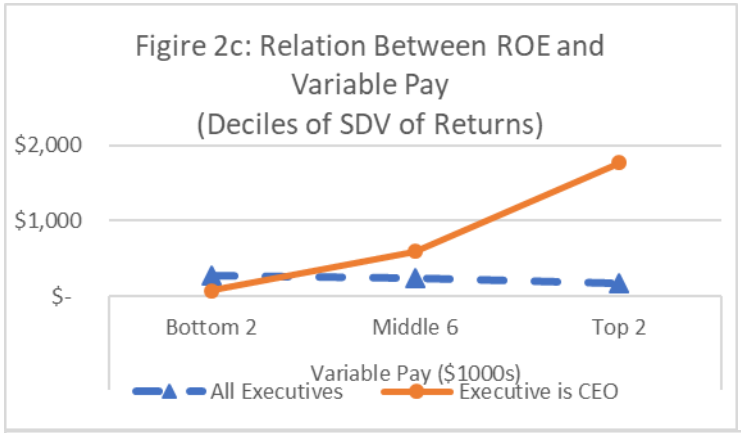


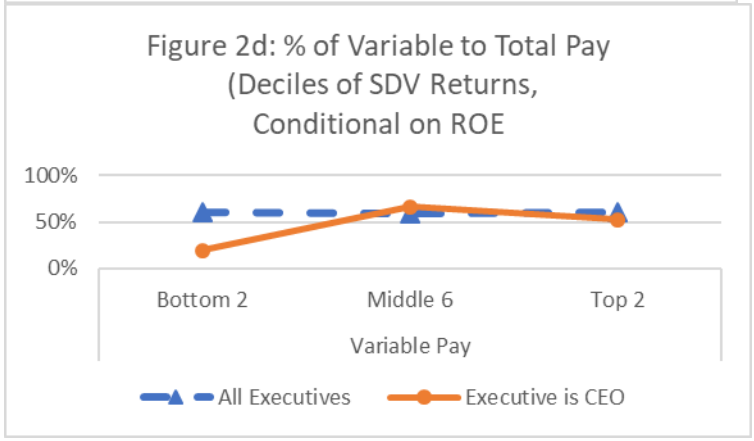


Figures 1a – 1d are based on the coefficients of the regression results in Table 4. The coefficients on ROA correspond to All Executives in the diagram and the coefficients on Executive is CEO are the incremental compensation for executives who are CEOs. The intercepts are not included in the diagrams.

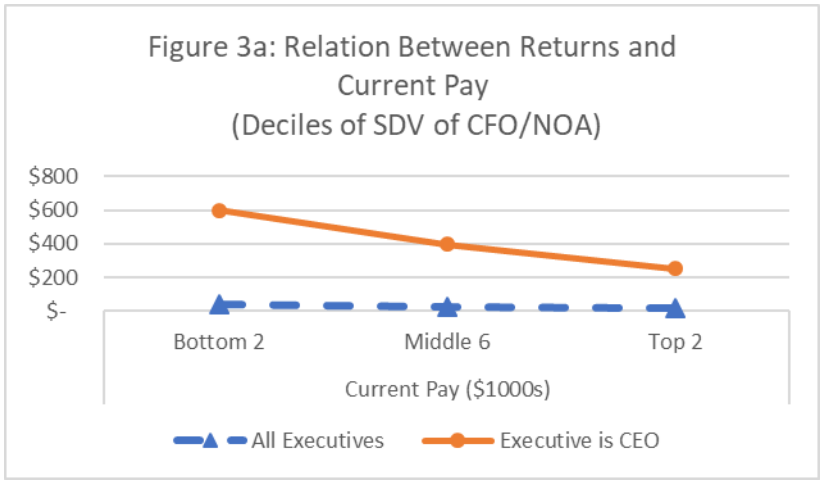


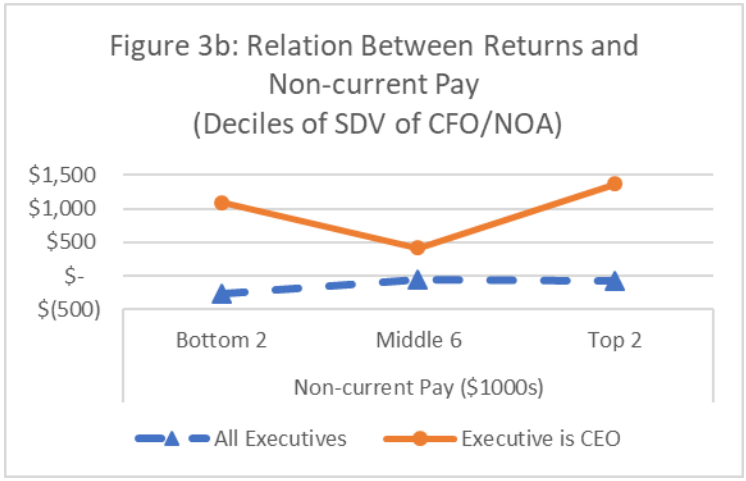






Figures 2a – 2d are based on the coefficients of the regression results in Table 6. The coefficients on ROA correspond to All Executives in the diagram and the coefficients on Executive is CEO are the incremental compensation for executives who are CEOs. The intercepts are not included in the diagrams.





Figures 3a and 3b are based on the coefficients of the regression results in Table 7. The coefficients on ROA correspond to All Executives in the diagrams and the coefficients on Executive is CEO are the incremental compensation for executives who are CEOs. The intercepts are not included in the diagrams.

Table 8: Breakup of Middle 6 Deciles: Relation Between Firm ROA and Executives' Current Pay (SDV of CFO-to-Avg NOA Sort)

	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8
Intercept	331.229***	532.946***	522.059***	443.911***	571.757***	368.674**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.027)
Return on Assets	1136.048***	1248.811***	956.757***	877.061***	807.300***	794.880***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Executive is CEO	461.705***	383.291***	823.048***	49.107	348.098***	518.924***
	(0.000)	(0.000)	(0.008)	(0.372)	(0.001)	(0.007)
Book-to-Market	-166.964***	-146.977***	-179.149***	-152.908***	-106.011***	-124.552***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Discretionary Accruals	-0.367***	-0.394***	-0.403***	-0.304***	-0.335***	-0.426***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage (Debt / Assets)	75.326	260.827***	199.345***	320.588***	89.284	122.682*
	(0.354)	(0.000)	(0.009)	(0.000)	(0.195)	(0.071)
Loss Year	-97.504***	-36.233	-66.759**	-34.414	-67.105**	-32.754
	(0.002)	(0.232)	(0.026)	(0.271)	(0.013)	(0.187)
Zmijewski's Z-score	-18.002***	-15.439***	-12.688***	-8.031***	-10.513***	-10.774***
	(0.000)	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)
CEO-chair Duality	206.495***	245.694***	-184.468	561.629***	199.932*	9.921
	(0.000)	(0.002)	(0.550)	(0.000)	(0.059)	(0.959)
Sector & Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	8159	8544	8333	8476	8092	8031
Adj R-squared	0.423	0.453	0.428	0.384	0.361	0.429

p-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$