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Industry Homogeneity and Performance Impact on Relative Pay Performance in Executive Compensation

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Industry Homogeneity and Performance Impact on Relative Pay Performance in Executive Compensation

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Dedication

I would like to dedicate this dissertation to my wife, Kayla, who made the entire process possible. Even in the most difficult circumstances she always helped me push forward.

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It is generally agreed that executives would do a better job managing shareholder interests if their pay was linked more directly to the performance of their firms, relative to that at peer firms. However, studies concerning the use of relative performance evaluation in executive compensation have found only weak evidence relating executive pay to peer-firm adjusted performance. This study introduces a simple model that considers executive switching and replacement cost effects on the power of the incentives that a firm can employ. The model predicts that firms with high replacement costs will find it difficult to pre-commit to a relative performance contract. The empirical results are partially consistent with the model. Firms from more homogeneous industries are more likely to pre-commit to a relative performance contract. Furthermore, the weaker (stronger) performing, more homogeneous firms, which should have lower (higher) replacement costs are more (less) likely to pre-commit. With respect to the degree of relative performance compensation paid after performance is realized, the evidence is mixed. Both industry homogeneity and performance ranking have an impact on the

degree to which relative performance evaluation is found. Overall, the results suggest that the availability of an accurate signal concerning relative performance, as well as the level of a firm's executive replacement costs, have an impact on its willingness to utilize a relative performance compensation system.

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Chapter 1: Introduction

The advantages of basing an executive's compensation on the firm's peer adjusted performance are demonstrated in Holmstrom's (1979, 1982) theoretical works. Relative performance evaluation (RPE) should incorporate a more informative signal as well as insure the manager from industry trends that are beyond the manager's control. Research has yet to document widespread use of RPE in executive compensation or to provide a definitive explanation for its absence.

This dissertation studies how a firm's executive replacement costs affect its ability to utilize RPE incentives. RPE has the well known positive effect of filtering out trends that are common to an industry, thereby better reflecting performance attributable to the efforts of a firm's managers. However, nonnegotiable contracts can lock the firm and the manager into a compensation outcome calculated by a formula such as RPE, leaving the firing and quitting decisions to be based on labor market conditions and replacements costs. In the presence of a mid-contract signal providing an indication of final firm output, there is an increased likelihood that the manager will voluntary depart the firm due to a downward revision of expected wages. This can precipitate the need for a wage revision. Since the signal will be known to both parties, the power of the incentives, defined as the difference between the high and low wage that the manager can receive, offered by the firm will be decreasing in replacement costs. Since RPE can be a high powered incentive, the likelihood of a firm pre-committing to RPE will be decreasing in replacement costs.

I construct a single period binomial model where the manager has the option of providing a high or low effort and the firm may pay the manager a high or low wage that is dependent upon firm output. The manager may leave the firm, subject to a switching

cost, if a better effort-compensation ratio is available outside of the firm. The firm may fire the manager if it can find a cheaper source of labor, subject to replacement costs, outside of the firm. The firm will also be subjected to replacement costs if the manager voluntarily departs. The model finds that increased switching costs will either maintain or reduce the power of the incentives that the firm provides as long as the power of those incentives has not already been minimized. The model also illustrates that the power of the incentives will be decreasing in the replacement costs and will collapse to zero with very large replacement costs. Since RPE incentives will behave this way, they will be ruled out for firms with large replacement costs. The firm will only revise wages when it is advantageous to do so, vis-à-vis incurring replacement costs for the new manager. The model is therefore useful in predicting where a pre-commitment to relative performance evaluation in compensation will not occur. That is, firms that face significant replacement costs will have limitations on their ability to utilize relative performance evaluation.

I empirically test pre-commitment to RPE using a firm's industry homogeneity and recent historical performance as a proxy for replacement costs. The results suggest that firms in more homogeneous industries are more likely to pre-commit to RPE, but the better performing more homogeneous firms are less likely to pre-commit. This is consistent with the model since better performing firms will likely have higher replacement costs than weaker performing firms.

Traditional measurement of post-performance RPE will measure the pay-performance result of firms that have pre-committed to RPE as well as firms that did not commit but still compensated in an RPE-consistent manner. This study utilizes the informational difference between pre-commitment to RPE versus waiting for a firm's post-performance results to incorporate RPE. If firms utilize RPE based upon the quality

of the performance signal that they receive, then we would expect for industry homogeneity to be important to a firm pre-committing to RPE as well as the level of post-performance RPE that is found. When post-performance RPE is empirically tested, the results suggest that recent performance is a factor in most instances; however, homogeneity is a factor when performance is not related to RPE. This is once again consistent with both replacement costs and the availability of a good industry-adjusted performance signal affecting RPE utilization.

The remainder of this dissertation is organized as follows: The next chapter reviews the relevant literature. Chapter 3 presents a simple model that evaluates the effect of switching and replacement costs on the power of compensation incentives. Chapter 4 empirically analyzes the likelihood of a firm to pre-commit to an irrevocable form of relative performance evaluation. Chapter 5 presents the empirical results concerning post-performance relative performance evaluation payouts and Chapter 6 offers conclusions for the dissertation.

Chapter 2: Relevant Literature

The principal-agent problem described in the moral hazard framework generally involves a risk-averse manager and a risk-neutral agent. The firm requires the manager to expend a high level of costly effort that is not observable by the agent. While complete risk-sharing cannot be attained, attempts to solve the problem have involved motivating the manager by both promising a share of the profits and by threatening to fire the manager.

While the literature has not directly addressed the issue, managers have the ability to influence the optimal contract by threatening to quit the firm. Likewise, the firm's ability to fire the manager may also influence the optimal contract. Together, these two influences should impact a firm's ability to utilize high powered incentives such as a compensation contract based upon the firm's performance relative to its industry peers.

This chapter proceeds by briefly reviewing the pay for performance and relative performance evaluation literature that may help to understand the effects described above. It then reviews the retention-related literature and the involuntary turnover literature in order to address a firm's executive departure issues.

Pay for Performance and Relative Performance Literature

Fama (1980) suggests that the need for explicit incentive contracts is lessened by the fact that internal and external labor markets alleviate problems with the separation of ownership and control. Since the labor market provides a full ex-post settling up, managers will be motivated by high wages and the prospect of higher future wages to expend high-level efforts. Fama assumes that the manager has enough time remaining in a career to prevent making short-sighted decisions. Holmstrom (1982) points out that for managers who are in the later stages of their careers, explicit contracts are needed

because there are fewer future-wage incentive periods remaining as motivation. Hartzell (1998) shows that pay-for-performance sensitivity should be decreasing in the probability of firing while it should be increasing in the probability of retirement. Therefore, firms should be cognizant of a manager's career stage when designing performance incentives.

In a test of learning versus incentives in managerial pay for performance, Murphy (1986) finds that the learning model is supported because the relation between pay and performance is stronger in a CEO's initial years. That is, revisions to CEO wages are greater in the early years when there is the most uncertainty concerning a manager's abilities.

Shavell (1979) shows that it is never Pareto Optimal for a risk-averse agent to bear all of the risks of production, whereas it is optimal for a risk-neutral agent. To spread the risk associated with production, the principal will insure the agent in the form of a minimum level of wages. Harris and Raviv (1979) find that the principal can realize some gains through monitoring the agent when providing this insurance, even when monitoring is imperfect and the risk-averse agent's actions cannot be observed. Therefore, even an imperfect relative performance evaluation (RPE) signal may help to improve the principal-agent relationship. Holmstrom (1979) also proves this and shows that to be optimal, a contract must incorporate the information contained in an informative signal. Holmstrom (1982) justifies the RPE solution to the principal-agent problem, finding that the executive benefits if insured from risk beyond the executive's control. Thus, if the compensation mechanism ignores information that is unique to the relative performance of the firm, the mechanism may be inefficient. Not withstanding the practical complications introduced by the accounting regulations associated with explicitly filtering industry and market shocks, it seems unlikely that firms would ignore

the potential benefits to RPE and would find creative ways to introduce an informative signal to their pay-performance contracts.

Jensen and Murphy (1990) find that the sensitivity of CEO to shareholder wealth is surprisingly low. When incorporating changes in contemporaneous compensation, changes in holdings, and the present value of changes in salary, they find that CEO wealth increases by about $3.25 per $1,000 in shareholder wealth. Although this level of sensitivity is generally thought to be too low for proper agent motivation, Haubrich (1994) finds that with high risk-aversion parameters, it is reasonably reconciled to agency theory predictions.

Another interesting concern is that of encouraging risk-averse agents to take projects that are commensurate with the risk-neutral position of the shareholders. Much of that literature has focused on the benefits of the convex payoff advantages inherent in option grants to firm executives. Guay (1999) documents that firms provide convex incentives in order to motivate managers to invest in risky projects, which could otherwise incur large losses through under-investment. DeFusco, Johnson and Zorn (1990) find that the variance of stock returns increases for firms after the approval of executive option plans. They also find that these firms generally exhibit a wealth transfer, wherein stock prices react positively post-event, while their bond prices react negatively. John and John (1993) note the possibility of over-encouraging management's investment in risky projects through the use of convex payoff incentives such as options. They find that the wealth transfer documented by DeFusco, Johson and Zorn (1990) can be alleviated when utilizing convertible debt in the firm's capital structure. Aggarwal and Samwick (1999a) find that executives of companies that have a low market return variance have higher pay-performance sensitivity. This may suggest that board of director compensation committees are aware of the adverse consequences of high-

powered incentives and use them to a greater extent when their cost is low. It is plausible that a board would handle other high powered incentives with adverse consequences, such as RPE, in a similarly constructive manner.

Much work has focused on measuring RPE and documenting its anemically perceived effect on compensation. Gibbons and Murphy (1990) find evidence of RPE, but also find it difficult to distinguish whether firms benchmark to their industry or some other broad market measure. Their work is supported by a number of proxy statements that show the market for executive talent extends well beyond a firm's respective proxy-required competitive industrial group. Antle and Smith (1986) study 39 firms over a long period and find evidence that compensation is more closely related to the relative return on assets than the absolute return on assets. While their results are encouraging for RPE in accounting returns, they support only partial market return filtering. Ely (1991) finds similar results in her examination of the Bank, Electrical Utility, Oil and Gas, and Retail Grocery industries.

A portion of the executive compensation literature has focused on industry factors that may affect compensation RPE. Antle and Smith (1986) warn that RPE may be detrimental to the firm when managers have the ability to change the industry where a firm competes. Dye (1992) finds that the benefits of RPE are lower when managers have a small number of available projects, but greater when they have either a larger number of project choices or none at all. He warns that RPE may motivate managers to invest in industries where they can outperform their competitors. Murphy (1999) states that RPE is increasingly popular in cyclical industries and utilities, where it is replacing budget-based measurement. He suggests that firms competing in homogeneous industries find the cost of the RPE signal less expensive than those in less homogeneous industries. One interpretation is that while a lower signal cost within an homogeneous group makes it

cheaper and more efficient to evaluate a firm's executives, it also makes it easier to evaluate executive candidates from outside an industry. This will help the firm to determine the size and quality of the executive pool from which the firm is likely to recruit a replacement. If replacement costs are impacting compensation policy then a larger talent replacement pool, relative to a less homogeneous group where the pool is smaller, might affect a firm's compensation policy. Johnson and Tian (2000) suggest that a firm can more accurately determine the reservation utility level for an executive when there are a larger number of firms in an industry. This means that more homogeneous industries will have less market level pay uncertainty.

Aggarwal and Samwick (1999b) contribute to our understanding of cross-sectional RPE industry variation by showing that the nature of competition in an industry will affect the maximizing incentives given to managers. They find that for firms in industries where the competition is Bertrand (strategically based) compensation should exhibit a positive and not negative (or index filtering) sensitivity to rival firm performance. That sensitivity should be increasing in competition. Their empirical evidence supports the hypothesis in a test of manufacturing firms. However, they find little overall evidence of relative performance in a 1993-1995 sample. In earlier work, Sklivas (1987) finds that compensation serves as a commitment device. He finds that if its competition is Bertrand, the firm can weight profits higher than sales in the compensation formula, committing the firm to less aggressive pricing behavior, which translates into higher profits. Sklivas finds the opposite if the competition is Cournot (output based), as the firm weights sales higher and more aggressive output forces lower profits. Kedia (1996) finds that firms producing strategic complements have more pay for performance than those producing strategic substitutes, where aggressive competition can be more detrimental to the firm.

Garvey and Milbourn (2001) suggest that older, more diversified executives do not require the benefits of RPE filtering for industry shocks while younger executives will benefit from RPE. Their empirical findings agree with that assertion.

RETENTION

Jensen and Meckling (1976) note that firms with a high probability of bankruptcy must pay higher salaries in order to induce executives to take the risk of working there. A high salary can be thought of as an insurance premium that helps compensate a risk-averse executive for a high-volatility wage contract. One benefit for the firm is that an executive can interpret a higher salary as an increase in the switching costs of leaving the firm. Gilson and Vestsuypens (1993) found that in a study of distressed firms, CEO replacements from inside the firm are generally paid 35% less than those they replace, while outside replacements are generally paid about 36% more than their predecessors. Although they suggest that outside replacements may have specialized expertise that helps to account for the difference, it may also indicate that there are high switching costs for prospective hires to leave their current employers. The firm may need to use increased compensation to establish a new high level of switching costs in order to overcome a high turnover rate. Blackwell and Farrell (1997) find that new CEOs who follow either forced or voluntary departures have significantly larger stock option grants than their predecessors. At the same time, those who follow forced departures also have higher salaries and bonuses than their predecessors, while those who follow voluntary departures do not. It appears that firms may be using compensation as a form of insurance for new hires who must join a weak team. Alternatively, firms may be attempting to align the executive's economic expectations with the interests of shareholders. Core and Guay (2001) find evidence suggesting that firms use options to attract and retain certain types of employees as well as for incentive purposes. Mehran

and Yermack (1999) find a negative relationship between option compensation and CEO turnover that is also consistent with firm use of compensation for retention purposes.

Firms generally justify the resetting or repricing of executive options that have fallen far out-of-the-money by arguing their incentive and retention merits. Brenner, Sundaram, and Yermack (2000) mention that firms that generally argue for re-setting strike prices on out-of-the-money options are under-performing. Such firms must believe that their executives are currently valuable to the firm as a going concern. They also find that the value to the executive from resetting options does not substitute for other related annual compensation and that executives with larger pay packages are more likely to have their options reset. If a higher level of compensation indicates a higher quality executive, we would assume that the likelihood of higher compensated executives having their options reset is greater than for lesser compensated executives. Chance, Kumar and Todd (2000) find a similar result with no evidence of reduced compensation to offset the value gained in repricing the options. Both studies indirectly imply that executives expect an annual compensation target which is not altered for special events like repricing options. Achyra, John and Sundaram (2000) show that some resetting is almost always optimal, but the advantages of resetting decrease as the costs of replacing incumbent managers decrease. Their interpretation is that the high cost of replacing executives helps to explain why firms retain and re-calibrate the incentives for existing managers rather than replace them.

The cumulative literature suggests that executive retention costs for a company as well as the switching costs for managers are an important part of the principal-agent relationship. Noting that option repricing is a costly contract renegotiation action, the renegotiation costs will be borne by the firm if executive replacements cost are at a

sufficiently high level. If true, a firm's commitment to a specific compensation contract may be a function of the potential cost to replace lost executive talent.

Parrino (1997) finds evidence consistent with the idea that poorer performing CEOs are easier to identify and cheaper to replace when they are working in homogeneous industries. As an extension of that result, industry homogeneity can be a proxy for the abundance of industry-specific human capital, which may in turn, affect a firm's ability to replace an executive. If true, then firms in more homogeneous industries will have fewer retention concerns, holding other variables constant, due to lower replacement costs. Those firms may be able to utilize a high powered pay-for-performance contract involving RPE. We would then expect to find greater contract-based RPE in more homogeneous industries if firms are looking to optimize their pay-performance relationships.

Industry homogeneity may also have a negative effect on a firm's ability to incorporate RPE. Fee and Hadlock (2003) find that executive talent raids by outside firms are more likely if the target executive's firm has outperformed an industry benchmark. We know that a firm competing in a more homogeneous industry will generate a clearer performance signal that will be available to industry outsiders as well as insiders. Compared to weak performers top performers within an industry, controlling for homogeneity, should be more sensitive to increases in the market wage for specific executive talent. This increased sensitivity might lessen a firm's ability to pre-commit to compensation-based RPE, and yet increase the need for the firm to ensure a relatively high post-performance wage to the top performing firm executives.

Himmelberg and Hubbard (2000) find evidence that the supply of qualified CEOs available to manage large corporations is relatively inelastic. They theorize that an executive pecking order results in top talent working for larger firms where their efforts

are put to better use because of the advantages in scale. Empirically, they find less compensation-based RPE in larger firms than in smaller firms. This finding suggests that firms increase compensation when they are sensitive to the possibility that top talent may leave voluntarily for better opportunities. If a similar argument can be made for performance levels, then better performing industry-ranked firms would compensate their executives at a post-performance level that is in line with their industry ranking in order to retain their top talent.

Hubbard and Palia (1995) find that deregulated banks have substantially higher executive turnover than those that did not deregulate. Their study offered insight to Himmelberg and Hubbard (2000) who theorized an executive pecking order. In a different line of reasoning, Garen (1994) predicts that the sensitivity of an executive's pay-to-performance should be decreasing in the size and the variance of the firm. Thus, as risk shifts from the individual executive to the firm, sensitivity diminishes. Smith and Watts (1992) find evidence that managers with a higher marginal effect on the firm are rewarded with higher compensation. In addition they find that managers with greater discretionary impact, such as those in firms with more growth options, are paid more.

Involuntary Turnover

Firms can also use potential termination as an incentive. Stiglitz and Weiss (1983) find that downward rigid wages motivate workers to generate higher efforts in order to prevent from being fired in the next period. Shapiro and Stiglitz (1984) find that the threat of termination serves as a motivational device and keeps firms paying more than a market wage, in turn helping to create an equilibrium level of unemployment. Coughlin and Schmidt (1985) and Warner, Watts, and Wruck (1988) find a negative relation between firm performance and the probability of executive turnover. Morck, Schliefer and Vishny (1989) find that while turnover is higher for firms that have

performed poorly, complete turnover is more likely in poorly performing firms within poorly performing industries. Hartzell (1998) finds that the threat of termination can substitute for incentive compensation. In a study covering a twenty-four year period, Huson, Parrino, and Starks (2001) find that although the frequency of CEO turnover and outside successions has increased, the relation between the likelihood of forced CEO turnover and firm performance did not significantly change. In fact, it did not vary during an intense takeover market. This may suggest that boards of directors require a minimum level of executive performance that has remained static over time. It would also indicate that boards may use firing as a base incentive, but that they do not use threat of firing to increase efforts.

Summary

While theoretically at least, it is clear that compensation based RPE will help to optimize contracts, most of the literature has found that the presence of RPE is weak at best in measuring a firm's performance relative to its industry competitors. Evidence suggests that high-powered incentives, which should include RPE, vary according to the competitive structure of a firm's industry, the age of its executives, and the degree of risk that the firm represents to the executive. To date, the RPE literature has not investigated a firm's costs to replace an executive.

Prior research has generally investigated the relationship of firm and industry post-performance to compensation levels and changes, industry RPE-based contracts and those that pay in a manner consistent with how we measure RPE. However, research to date has not documented pre-commitment RPE.

Executive turnover is related to the cost of firing and replacing an executive as well as a firm's ability to confirm that a manager's performance was poor. The model in

the next chapter investigates how the cost of executive departures affects a firm's ability to offer high-powered incentives.

Chapter 3: A Model of High Powered Incentives in the Presence of High Replacement Costs

The purpose of this chapter is to provide a theoretical understanding concerning executive replacement and switching costs in the power of the incentive compensation that firms offer to managers. A simple single-period binomial model is constructed where the manager has the option of providing a high or low effort and the firm may pay the manager a high or low wage that is dependent upon firm output.

The model includes switching costs incurred by the manager when voluntarily leaving the firm. It also includes the firm's cost to replace a manager who has departed voluntarily or has been fired. The primary effect of switching costs is to either maintain or reduce the power of the incentives that the firm provides as long as the power of those incentives has not already been minimized. While replacement costs may appear to allow for the firm to provide higher power incentives when replacement cost are only incurred for firing, they will reduce the power of the incentives when the firm has to account for a voluntary departure by the manager. The net effect of the switching and replacement costs is to generate incentive power that is either constant (and zero) or decreasing in replacement costs. Since relative performance evaluation incentives are high powered incentives, we should find that firms with high replacement costs will be less likely to utilize relative performance evaluation. The model assumes that the contract is binding from the perspective that the manager's wage levels cannot be reduced. However, it also includes the possibility that the firm may increase the manager's pay if a signal is received that predicts that the manager will leave the firm.

The model is useful in predicting pre-commitment based relative performance in compensation. That is, firms that face significant replacement costs will have limitations on their ability to utilize pre-commitment relative performance evaluation.

The chapter proceeds by presenting the full switching and replacement costs problem for descriptive purposes. After the initial presentation, a simpler version containing minimal constraints is presented and analyzed so that the additional constraints can be understood when added back in.

Model

The model contains a single performance period and is set in a moral hazard framework. At t =0 the risk-neutral manager and the firm agree to a contract to pay the manager a wage that is based upon the output that the manager will produce during the period. Output will either be high or low, where $\pi_H > \pi_L$. Firm output is the partial result of managerial effort where the manager has the choice of either a high or low effort, where $e_H > e_L$ comes at a cost to the manager of either $C(e_H)$ or $C(e_L)$ and $C(e_H) > C(e_L)$. At t=1, a high wage will be paid if output is high or a low wage paid if output is low (W_H or W_L). Limited liability is assumed which makes both wages non-negative.

If the manager chooses e_H then the probability of high output is increased by e over the probability P of high output given a low effort. That is,

$$P(\pi_H| e_L) = P \quad (1)$$

$$P(\pi_L| e_L) = 1-P \quad (2)$$

$$P(\pi_H| e_H) = P+e \quad (3)$$

$$P(\pi_L| e_H) = 1-P-e \quad (4)$$

It is assumed that $0.5 < P < 1$, $0 < e < .5$, as well as $0.5< P+e < 1$.

The manager's utility will depend upon the level of effort that must be expended to achieve a given wage level. See Figure 1 for a display of the possibilities as well as the timing.

The cost minimizing firm will seek to pay the lowest total expected payout that is possible subject to three constraints. First, the risk-neutral manager must expect to receive a higher utility level for a high effort than the expected utility for a low effort. Next, the expected wage paid by the firm for a high effort must be greater than the expected utility offered in the market for a high effort (U_i), less a cost to the manager (S) for switching firms. The manager will switch employers if the switching costs do not totally erode the higher wage available at the new employer. An example of switching costs would be unvested compensation that will be lost at the incumbent firm if the manager voluntarily leaves. It may also include the costs associated with finding a new position. Last, the expected wage for a high effort must be less than or equal to the wage that the firm would have to pay a new employee for a high effort (W_i), plus costs to the firm for firing and replacing (F) the old manager. If cheaper labor is available then the firm will fire the manager as long as the replacement costs do not totally erode the cheaper labor costs provided by the new manager.[1] The complete problem for the cost minimizing firm is to minimize total expected compensation, D, with constraints as below.

$$\text{Min}: \quad D = (P + e)W_H + (1 - P - e)W_L \tag{5}$$

subject to the following 3 constraints.

[1] The costs to the firm for replacing a manager who has voluntarily departed are not yet included. They are considered in an informational signal adaptation of the model at the end of the analysis.

$$(P+e)(W_H)+(1-P-e)(W_L)-C(e_H)\geq (P)(W_H)+(1-P)(W_L)-C(e_L) \tag{6}$$

$$(P+e)W_H+(1-P-e)W_L \geq U_i - S \tag{7}$$

$$(P+e)W_H+(1-P-e)W_L \leq W_i + F \tag{8}$$

For simplicity, the cost of a low effort is assumed to be zero.

$$C(e_L)=0 \tag{9}$$

Equation (6) is the incentive compatibility constraint while (7) and (8) are the voluntary departure and firing constraints, respectfully. After the analysis concerning the three constraints is complete the model proceeds to include an interim period signal for future output that will be available to both firm and manager. If the signal predicts that output will be low then it will provide an opportunity for the manager to voluntarily leave the firm if the manager's utility can be improved by working for another firm. The contract then implicitly incorporates the possibility for an upward wage revision.

Simple Cost Minimization Problem

We begin by calculating the total expected wage that the firm expects to pay the manager that is subject to a single incentive compatibility constraint. The switching and firing cost constraints will first be ignored in order to understand their incremental effect when they are included in the analysis. As will be apparent later, this simply corresponds to the case where switching and replacement costs are very large.

$$\text{Min}: \quad D = (P + e)W_H + (1 - P - e)W_L \tag{5}$$

subject to (6)

$$(P + e)(W_H) + (1 - P - e)(W_L) - C(e_H) \geq (P)(W_H) + (1 - P)(W_L) \tag{6}$$

Since W_H and W_L are non-negative, the problem can be solved by forcing W_L =0 and W_H equal to the minimum compensation differential required by equation (6). Therefore, (5) will be minimized with $W_H = \frac{C(e_H)}{e}$ and $W_L = 0$. The intuition is that as long as there is a wage differential of $\frac{C(e_H)}{e}$ between W_H and W_L, then (6) will be met. A smaller differential will make the expected wage of a low effort greater than the cost-of-effort adjusted expected wage of a high effort. The minimum cost contract will then be where $W_H = \frac{C(e_H)}{e}$ and $W_L = 0$.

The power of the incentives for high effort will be the wage differential referred to above, i.e.,

$$W_H - W_L = \frac{C(e_H)}{e} - 0 = \frac{C(e_H)}{e}. \tag{10}$$

Voluntary Departure with Switching Costs are Introduced

The analysis proceeds by introducing the possibility that the manager will voluntarily leave the firm if a better compensation package is available outside of the firm. The manager will voluntarily depart if it is possible to obtain another position outside of the firm that provides incentives for a high effort level that will pay a wage some value above U_i that will account for the switching costs. The manager's cost of leaving the firm, plus the cost to find another position are denoted S. The problem is now updated with the additional constraint.

$$\text{Min}: \quad D = (P + e)W_H + (1 - P - e)W_L \tag{5}$$

subject to the following 2 constraints.

$$(P + e)(W_H) + (1 - P - e)(W_L) - C(e_H) \geq (P)(W_H) + (1 - P)(W_L) - C(e_L) \tag{6}$$

$$(P + e)W_H + (1 - P - e)W_L \geq U_i - S \tag{7}$$

Since a constraint has been added to the problem, the smallest W_H that can possibly be attained will be as found in (10). Otherwise, the incentive to exert a high effort will not be sufficient given constraint (6). It is first assumed that (6) is more constraining (greater) than (7). In that event, the following adaptation from (7) will hold.

$$\frac{(P + e)C(e_H)}{e} + (1 - P - e))*0 \geq U_i - S \tag{11}$$

The optimal contract will then contain

$$W_H = \frac{C(e_H)}{e} \text{ for } \quad \frac{(P+e)C(e_H)}{e} + (1-P-e))*0 \geq U_i - S. \tag{12}$$

This is the same value calculated for the case without the choice of a voluntary departure. The power of the incentives will also be the same.

$$W_H - W_L = \frac{C(e_H)}{e} - 0 = \frac{C(e_H)}{e} \text{ for } \frac{(P+e)C(e_H)}{e} + (1-P-e))*0 \geq U_i - S \tag{10}$$

If the quitting constraint is not binding then the power of the incentives are unchanged relative to the case where the manager cannot quit. The power of the incentives will remain constant and are neither increasing nor decreasing in switching costs.

We must now find the power of the incentives where the switching cost constraint is binding. Equation (7) is written below for quick reference.

$$(P+e)W_H + (1-P-e)W_L \geq U_i - S \tag{7}$$

If $W_L = 0$, then (13) holds and W_H must be solved for directly in (7) as found in (14).

$$\frac{(P+e)C(e_H)}{e} \leq U_i - S \tag{13}$$

$$W_H = \frac{U_i - S}{P + e} \tag{14}$$

and

$$W_L = 0. \tag{15}$$

Checking that the solution satisfies (7) we find that (16) verifies the solution.

$$(P + e)\left(\frac{U_i - S}{P + e}\right) + (1 - P - e) * 0 = U_i - S \tag{16}$$

The power of the incentives are now as in (17).

$$W_H - W_L = \frac{U_i - S}{P + e} - 0 = \frac{U_i - S}{P + e} \tag{17}$$

In order to compare (17) to (10) assumption (13) is used to find (18).

$$\frac{C(e_H)}{e} \le \frac{U_i - S}{P + e} \quad \text{if} \quad \frac{(P + e)C(e_H)}{e} \le U_i - S \tag{18}$$

This means that the power of the incentives are larger if switching costs are smaller. The power of the incentives is also decreasing in S. The result is straight forward. If switching costs are high, then the manager is less likely to leave the firm. This will enable the firm to provide lower powered incentives as switching costs increase.

The firm will continue to do so until the minimum incentive in (10) in reached. This leads to the following proposition.

Proposition: The power of the incentive is non-increasing in switching costs.

An additional case must be investigated. If (7) is non-binding, then (6) must be the binding constraint. An alternative description is represented in (19).

$$\frac{(P+e)C(e_H)}{e} \geq U_i - S \tag{19}$$

This case appears to be identical to the first case in the switching costs model. However, an additional solution must be analyzed. This third case represents the possibility that the lowest power of incentives in (10) is operable and can be met with $W_L > 0$. Put another way, the right hand side of (19) represents the total expected utility that must be achieved to retain the executive while the left hand side represents the differential incentive required to encourage the executive to provide a high effort level. Therefore, another way of achieving all of the constraints is for W_L to be non-zero where the minimum power of incentives is utilized.

Since the minimum power of incentives will solve the problem, we can make W_H a function of W_L and then solve for W_L in constraint (7).

$$W_H - W_L = \frac{C(e_H)}{e} \tag{20}$$

===>

$$W_H = W_L + \frac{C(e_H)}{e} \tag{21}$$

If (21) is substituted into (7), (22) is obtained.

$$(P+e)\left(W_L+\frac{C(e_H)}{e}\right)+(1-P-e)W_L \geq U_i - S \tag{22}$$

Now, W_L is found in (23) and is used to solve for W_H as in (24).

$$W_L = U_i - S - \frac{(P+e)C(e_H)}{e} \tag{23}$$

$$W_H = \frac{C(e_H)}{e} + U_i - S - \frac{(P+e)C(e_H)}{e} \tag{24}$$

Although the power of the incentives was used to solve for W_L and W_H, a brief review of (10) will be helpful.

$$W_H - W_L = \frac{C(e_H)}{e} \quad \text{for} \quad \frac{(P+e)C(e_H)}{e} \geq U_i - S \tag{10}$$

The power of the incentives is therefore at a minimum level and will be constant in S.

To summarize the switching costs model, there are two general cases concerning the power of the incentives and are summarized below.

$$W_H - W_L = \frac{C(e_H)}{e} \quad \text{for} \quad \frac{(P+e)C(e_H)}{e} \geq U_i - S \tag{10}$$

and

$$W_H - W_L = \frac{U_i - S}{P + e} \quad \text{for} \quad \frac{(P + e)C(e_H)}{e} \leq U_i - S \tag{17}$$

The analysis shows that where managers have large job switching costs, the power of the incentives provided to the manager will be at the lowest possible level, constant and neither increasing nor decreasing in switching costs. For small switching costs, the power of the incentives will be larger than the minimal level but will be decreasing in switching costs. As such, the inclusion of switching costs cannot increase the power of the incentives. The power of the incentives, as a function of switching costs, can only decrease to an absolute minimum. The analysis confirms the proposition.

Introduction of Replacement Costs

The possibility that the firm will fire the manager is now introduced. The two previous constraints remain active. It is assumed that the firm can hire a new manager to expend a high effort level for an expected wage of W_i. The total costs of firing the current manager, plus any recruiting costs for the new manager are F. The problem is described below.

$$\text{Min}: \quad D = (P + e)W_H + (1 - P - e)W_L \tag{5}$$

subject to the following 3 constraints.

$$(P + e)(W_H) + (1 - P - e)(W_L) - C(e_H) \geq (P)(W_H) + (1 - P)(W_L) - C(e_L) \tag{6}$$

$$(P + e)W_H + (1 - P - e)W_L \geq U_i - S \tag{7}$$

$$(P + e)W_H + (1 - P - e)W_L \leq W_i + F \tag{8}$$

The new constraint says that if a firm knows that it is paying too much for a manager, relative to comparable pay for a new manager (plus replacement costs), then the firm will fire the manager. The first case to analyze is where (25) will hold.

$$W_i + F \leq U_i - S \tag{25}$$

Condition (25) says that the expected utility in the market is greater than or equal to the expected wage in the market. An interpretation is that an executive's expected utility for a high effort is greater than the market level of compensation unadjusted for the effort. The executive finds the cost of the effort in that job to be larger than the wage. The power of the incentives collapses to zero.

A similar case is where

$$W_i + F \leq \frac{C(e_H)}{e}. \tag{26}$$

Condition (26) more explicitly describes a similar possibility that the market wage for a high effort is very small relative to the cost of that effort. An example is where a seasoned office executive cannot be paid enough to compensate for the effort required to do physical construction work. The result is that the executive opts not to work for the firm and the firm would rather the executive not work for the firm. The power of the incentives is once again zero.

The cases where contracts with incentives can be obtained are described in (27) and (28).

$$W_i + F \geq U_i - S \geq \frac{C(e_H)}{e} \tag{27}$$

$$W_i + F \geq \frac{C(e_H)}{e} \geq U_i - S \tag{28}$$

Since the new replacement cost constraint is non-binding, then it is clear that we either have the minimum possible power of incentives in (10) or incentives that are decreasing in S as in (17). Replacement costs from firing an executive will have no effect on the power of the incentives. It should be noted what will occur in (27) or (28) when replacement costs and switching costs are infinite. In that case, firing cannot occur and switching firms cannot occur. The resulting contract will be the minimum power of incentives found in (10).

$$W_H - W_L = \frac{C(e_H)}{e} - 0 = \frac{C(e_H)}{e} \tag{10}$$

A more realistic case is now introduced where replacement costs to the firm are also incurred when an executive voluntarily departs. In addition, it is assumed that there is an α probability that a signal concerning the final output by the manager will be produced. The signal, if it is generated, is not a perfect predictor and it occurs after the contract is negotiated but before output is realized. The problem is made more difficult for the firm because the manager also has access to this signal and will make the decision to leave the firm if market level utility expectations are not met. That is, if a low output

signal is generated then the manager knows that compensation will fall below what is known to be competitive for the effort level. The replacement costs to the firm to recruit a new manager may make the firm want to retain the services of the manager. The firm must then be prepared to revise the low wage that the manager will receive if a low output signal is received. It is assumed that constraint (7) is binding in order to fully capture the effects of the manager quitting the firm.

$$(P + e)W_H + (1 - P - e)W_L \geq U_i - S \tag{7}$$

Three possibilities can occur.

1. No signal is generated with probability of 1- α. In that event, the power of the incentives are as in (17).

$$W_H - W_L = \frac{U_i - S}{P + e} \quad \text{for} \quad \frac{(P + e)C(e_H)}{e} \leq U_i - S \tag{17}$$

2. The signal occurs but it is a good output signal where (17) once again holds because the signal does not cause the manager to be concerned about the wage to be received.
3. The signal occurs and it indicates low output. Since the firm does not want the manager to leave the firm, it can revise the low output wage subject to the replacement costs that the firm would incur if it lost the manager and had to recruit a replacement.

Case 3 raises the possibility that the firm will raise W_L in order to prevent the manager from leaving the firm. That wage is revised to the amount shown in (29).

$$W_L = \frac{(U_i - S) + (W_i + F)}{2} \tag{29}$$

The wage is based upon the minimum wage that the manager is willing to work for as suggested by the market utility for a high effort. It is a linear combination of the minimum wage required for the manager to stay at the firm and the maximum possible wage that the firm will be willing to pay. The average of the two wages is used so that it adjusts the low payoff to the manager as if the minimum wage is paid half of the time and the maximum wage the other half of the time. The wage in (29) assumes that the average of the two wages is used but it is chosen for illustrative purposes. Any linear combination that includes a positive maximum wage will achieve the same results.

Note that W_H will be unchanged and as in (14) while W_L will be one of two possibilities.

$$W_H = \frac{U_i - S}{P + e} \tag{14}$$

$$W_L = 0 \text{ with probability } 1\text{-}\alpha, \text{ or} \tag{30}$$

$$W_L = \frac{(U_i - S) + (W_i + F)}{2} \text{ with probability } \alpha. \tag{31}$$

Constraint (6) is now revised to incorporate the signal.

$$(P+e)\left(\frac{U_i - S}{P+e}\right) + (1-P-e)*\left((1-\alpha)*0 + \alpha\left(\frac{(U_i - S)+(W_i + F)}{2}\right)\right) - C(e_H) \geq$$
$$P\left(\frac{U_i - S}{P+e}\right) + (1-P)*\left((1-\alpha)*0 + \alpha\left(\frac{(U_i - S)+(W_i + F)}{2}\right)\right) \tag{32}$$

Note that if α is equal to zero, then (32) can easily be attained. Solving for α in (33) we find the critical level for which (32) holds.

$$\alpha \leq \left(\frac{U_i - S}{P+e} - \frac{C(e_H)}{e}\right) \Big/ \left(\frac{(U_i - S)+(W_i + F)}{2}\right) \tag{33}$$

Since (7) is binding, the numerator and the denominator in (33) is positive. However, note that if the replacement costs are large, then (33) will not hold. In that case, the firm will not revise the contract and the manager will leave the firm where the power of the incentives goes to zero. If (33) holds then the power of the incentives will be as shown in (34).

$$W_H - W_L = \frac{U_i - S}{P+e} - \alpha\left(\frac{(U_i - S)+(W_i + F)}{2}\right) \tag{34}$$

Now, it is easy to see that the power of the incentives will be decreasing in the replacement costs that the firm will incur to replace the manager. In addition, the power of the incentives will be decreasing in the probability that a signal concerning the output will be generated. The probability of receiving a signal, and a negative one in particular, introduces an extra opportunity for the manager to leave the firm. This opportunity provides a reducing effect on the power of the incentives.

Another condition that must be considered is constraint (6). It is required to provide incentives for high output. That leads to (35).

$$\frac{U_i - S}{P + e} - \alpha\left(\frac{(U_i - S) + (W_i + F)}{2}\right) \geq \frac{C(e_h)}{e} \tag{35}$$

If (35) holds then the power of the incentives will be decreasing in the replacement costs as well as decreasing in the probability of receiving a signal concerning output. If (35) does not hold, then the power of the incentives collapses to zero as no effort is provided and no wages are paid.

The results find that in the presence of replacement costs where the manager can voluntarily leave the firm, the power of incentives provided to a manager will either be decreasing in replacement costs or they will be zero if replacement costs are very high.

Summary

This chapter presents a one-period, two-effort moral hazard model where the firm needs to provide incentives for the risk-neutral manager to supply a high level effort. It incorporates managerial switching costs, when voluntarily departing the firm, as well as replacement costs to the firm when either form of managerial departure occurs. Optimal contracts are derived whereby the power of the incentives can be measured for the effects from switching and replacement costs.

The model finds that the power of the incentives that a firm may employ will be decreasing in the costs incurred by the firm to replace a manager. The results indicate that high powered incentives may not be available to firms with high replacement costs. The model also finds that the power of the incentives offered by a firm will be non-increasing in executive switching costs. The logical extension of the result provides motivation for empirical evaluation of a number of research questions concerning high

powered incentive compensation. In particular, does firm implementation of relative performance evaluation in compensation vary in relation to replacement costs. The model predicts that relative performance evaluation should be used to a lesser extent in firms where replacement costs are large. A full explanation concerning other implications is left for future research.

Chapter 4: Testing for RPE Commitment in Firms

The model in the previous chapter demonstrates that the power of the incentives offered by a firm to a manager will decrease as the costs that a firm incurs to replace a manager increase.[2] In the case where replacement costs are very high, the power of the incentives will collapse to zero. The model assumes that the pay-performance contract is agreed upon at the beginning of the performance period but allows the firm to make an upward revision of wages to prevent a manager from leaving. Since relative performance evaluation in compensation (RPE) is a high-powered incentive, the model predicts RPE pre-commitment will be less prevalent for firms with high replacement costs. The purpose of this chapter is to test that prediction.

Earlier work finds that if RPE provides a valuable signal concerning a management team's performance, then RPE involvement should help to improve a firm's pay-performance relation (See Holmstrom (1979, 1982)). If a firm operates in a highly homogeneous industry where there are many closely related products or services, then the performance of that firm is both easier to quantify and more statistically meaningful. We should then find a greater degree of RPE in the pay-performance relationship of a firm that is competing in a more homogeneous industry (compared to less homogeneous industry firms) as long as frictions that are not related to the better industry performance signal do not significantly alter the theory.

An alternative hypothesis concerning industry homogeneity states that there is a greater amount of industry-specific executive talent in more homogeneous industries than in less homogeneous industries. Given the greater supply of industry-specific human

[2] The power of the incentives is defined as the differential between compensation for high output and compensation for a low output.

capital in homogeneous industries, we expect lower executive replacement costs for these firms than for those from less homogeneous industries. Consequently, industry homogeneity serves as a proxy for executive replacement costs with higher costs corresponding to less homogeneous industries. If compensation-based RPE commitment is negatively related to a firm's replacement costs, then firms competing in more homogeneous industries should have lower replacement costs and be more inclined to pre-commit to RPE than firms that compete in less homogeneous industries. This reasoning leads to Hypothesis I.

Hypothesis I: Firms competing in more homogeneous industries should be more inclined to pre-commit to relative performance compensation contracts than firms in less homogeneous industries.

Evidence in support of Hypothesis I is consistent with firms using RPE where a more accurate performance signal is available as well as where replacement costs are low. If industry homogeneity is positively related to a firm's willingness to commit to RPE, it will be empirically difficult to determine which alternative better explains a firm's propensity to involve RPE. However, an examination of a firm's recent performance relative to its industry may be used to empirically distinguish between the clearer signal explanation and the replacement costs explanation. I propose that a firm's level of replacement costs will be positively related to a firm's industry-performance ranking. This proposition is supported by work by Hayes and Schaefer (1999) and Fee and Hadlock (2003).

Evidence suggests that firm's attempt to upgrade their executive talent in an effort to improve their industry-performance ranking. Hayes and Schaefer (1999) find evidence

supporting the hypothesis that managers with superior perceived abilities are generally targeted as executive candidates by raider (hiring) firms. They also find a positive (negative) initial market reaction for the raider (raided firm) upon announcement of a successful talent raid. This is consistent with the explanation that external recruitment is a means to improve a firm's performance. In similar work, Fee and Hadlock (2003) find that raider firms appear to target executives of higher performing firms when they look to recruit a CEO. Their sample is comprised of proxy named executives in the raided firm who accepted the position of CEO at the raider. As long as proxy level executives continue to be candidates for external CEO positions, the Fee and Hadlock results suggest that a raider will tend to recruit top executives from the talent base of firms with a higher performance level than the raider.[3]

Fee and Hadlock (2003) also find that raiders make hiring grants that are related to the forfeited unvested compensation that managers have accumulated during their tenure at the raided firms. This means that raiders are reducing the switching costs involved for a manager to accept a new position. It also increases the replacement costs to the raider. Since the forfeited value should be an increasing function of the raided firm's recent historical performance (assuming that the forfeited value is equity based) then a major source of a firm's cost to recruit an executive from a highly ranked firm should be higher than if they chose to recruit from a weakly ranked firm.[4]

The literature suggests that if firms follow a rule to recruit high level executives from firms with a better performance record than their own, then we would expect higher

[3] This is similar to the recruitment process in the academic market. Universities generally recruit faculty that have either completed a Ph.D. from a university with a higher ranking or from the faculty of a higher ranked university. While lower university sourced candidates will eagerly apply for an opening at a top school, those applications are rarely successful due to the hiring preference of the top-ranked schools.
[4] This will be true as long as weaker performing firms have not paid their executives larger values of compensation, that is subject to vesting, than the better performing firms in the industry. If this were not true, then it might be an example of a negative pay-for-performance relationship. The pay-for-performance case is assumed to hold.

ranked firms to have higher expected recruitment or executive replacement expenses than lower ranked firms.

Arguments to the contrary should be noted. First, a higher ranked firm may have a greater probability (and consequently partially reduced recruiting costs) of successfully recruiting a top executive than a lower ranked firm since the recruited executive might perceive greater compensation opportunities while working for a highly ranked firm. While this argument appears feasible for managers from firms with a marginally weaker performance history, it is improbable that a top-performing firm would recruit talent from a perennially poor industry performer. Another counter argument suggests that firm performance is not necessarily indicative of non-CEO talent. If true, then industry-ranked performance will not serve as a proxy for the quality of the individual. While this may be true in some instances, the Fee and Hadlock (2003) evidence suggests that any proxy named executive may be a candidate for the top position at another firm. Therefore, while firm performance may not reflect the ability of all of a firm's top executives, it should be a reasonably good indicator of executive ability.

I proceed by assuming that a firm's industry-performance ranking is positively related to the expected costs of replacing a lost executive although the net effect of the arguments and counter arguments is ultimately an empirical question. It follows that if replacement costs negatively impact compensation RPE, then a firm's industry-adjusted performance will negatively impact the likelihood of pre-committing to RPE. This leads to Hypothesis II.

Hypothesis II: Weaker performing firms should be more inclined to commit to an RPE mechanism than their stronger performing counterparts.

Evidence in support of Hypothesis II would provide more conclusive evidence regarding replacement cost effects of RPE pre-commitment. Before proceeding to the data and empirical setup, it is important to understand some of the limitations firms face in their compensation design choices. I briefly summarized these limitations below.

Frictions Due to Accounting and Compensation Conventions

Accounting and compensation convention make RPE difficult to incorporate in executive compensation. They also make it difficult to document a firm's intentions to utilize an RPE compensation plan. The principal effect of accounting and compensation convention is to reduce a firm's ability to fine-tune its compensation payout through an RPE formula (see Appendix A).

The realistic choice for equity-based compensation is to involve RPE calculations in the size of an initial grant or possibly to accelerate the vesting restrictions on a grant after the initial grant date. The income statement expense required to index the strike price of an already granted option (which is considered a post-grant modification) can be prohibitive. Therefore indexing is generally considered inferior to pre-grant calculations or the alternative that accelerates vesting based upon a predetermined performance criteria. However, the more "income statement expensive" method would generate better principal-agent incentive alignment. While cash-based programs do not suffer from this friction, they do have a greater problem. The amount required for a cash payout to be a significant portion of an executive group's annual compensation can impact a firm's cash flow. Therefore, accounting and cash limitations will make it difficult to incorporate a finely tuned, yet economically significant RPE-based mechanism into the process. This may also help explain the limited systematic RPE in cash-related compensation plans. These limitations also necessitate creative solutions for incorporating RPE into the pay-

for-performance relationship. The data gathering process to find RPE commitment must also be flexible enough to capture firm intent.

Empirical Setup and Data Description

The central question in this chapter is whether pre-commitment to RPE compensation varies according to the replacement costs that a firm will be subjected to in the event of an executive departure. Hypothesis I predicts that more homogeneous firms should be more willing to commit to an RPE mechanism. As stated above, the joint hypothesis predicts that firms will utilize RPE when a statistically more meaningful signal exists and when executive replacement costs, proxied by industry homogeneity, are lower. If industry-ranked performance is indicative of executive replacement costs, then a negative relation between performance and pre-commitment to RPE should exist. As stated in Hypothesis II, lower industry-performing firms should exhibit a greater propensity to pre-commit to an RPE compensation mechanism than higher performing firms. Evidence in support of both hypotheses is needed to provide support for the prediction that replacement costs are negatively related to the likelihood that a firm pre-commits to RPE.[5]

While this study focuses on industry-based relative performance measures, Gibbons and Murphy (1990) suggest that identifying a correct benchmark may be difficult. In fact a number of compensation committee proxy reports specifically point out that the competitive market for their executive talent needs extends beyond the SEC-required industrial proxy comparison group. In order to investigate wider definitions of relative performance, I divide RPE commitment into four broad measures. I define industry relative measures as any measure where a firm's market derived returns are

[5] Pre-committing to RPE means that a firm described a formal mechanism to incorporate RPE into a portion of their compensation. Proxy statements for the S&P 500 were examined to identify whether a firm committed to an RPE mechanism or not. The exact procedure is discussed later in this chapter.

compared to the market returns of a similar industry composite for a compensation calculation. The measure does not require that the firm utilize a commonly known industry composite, and in many cases the proxy statements suggest that different firms within the same industry define their peers differently. I define accounting relative measures as any measure where a firm's financial statement sourced data is compared to an industry financial statement composite in order to calculate a type of compensation. Since comparing financial statements across industries will be meaningless in most instances, accounting relative measures can be viewed as an alternative method of utilizing industry-based RPE. One possible reason for utilizing this method may be asymmetrical informational barriers that will not be overcome within the compensation horizon. I define broad market relative measures as any measure where a firm's market derived returns are compared to the market returns of some broad market measure or some static market level for a compensation calculation. This method is included to account for the concerns of Gibbons and Murphy (1990). Finally, I define the all relative measures as any of the above measures. It is included to investigate the most liberal definitions of RPE.

While the type of RPE pre-commitment is important, the compensation tool that a firm uses is also important. Compensation committee reports stress that while retention is a key item in a compensation plan, they also frequently reference short-term and long-term goals. This provides the rationale for a firm to use a multi-faceted approach to compensation. Therefore, I classify the data according to the compensation tool category where RPE commitment is found. Thus, the classifications are: all compensation combined, bonus, all long-term compensation, all long-term compensation excluding options, and long-term compensation that is cash based such as performance, phantom and long-term cash incentive plans. I include all compensation combined to capture all

possibilities and also to anticipate the data requirements in utilizing a maximum likelihood method on a relatively small data set. I include bonus data to investigate short-term incentive compensation. Cash based plans do not create income statement penalties when utilizing RPE directly and should not be discarded when studying RPE pre-commitment. I analyze all long-term compensation to provide data for the maximum likelihood estimation process while broadly considering the entire long-term component as a single decision. All long-term compensation excluding options effectively includes all restricted stock grants as well as long-term cash and performance plans. As discussed in Appendix A, this category provides a low "income statement" cost method for delivering RPE. Finally, I study long-term compensation that includes only cash and performance-based plans to investigate the use of pre-commitment based RPE in long-term cash plans. This category provides the study the most flexible portion of the long-term compensation component but at a relatively high empirical cost of limited data.

In order to test the relation of a firm's willingness to commit to RPE, I employ a probit model where the likelihood of committing to an RPE mechanism is a function of a firm's one' or two-year return percentile within its 2-digit SIC code, the industry homogeneity percentile for the 2-digit SIC code that is a firm's primary line of business, and an interaction term involving the firm's one' or two-year industry return percentile and its homogeneity percentile. Industry percentile returns are utilized in order to capture a firm's performance relative to its industry without the outlier distortions of significantly poor or great performance years. The interaction term is utilized to help distinguish between the clarity of signal and replacement cost explanations concerning industry homogeneity.

Control covariates account for the propensity to commit to RPE related to factors other than replacement cost issues. The control covariates are revenue, research and

development as percent of revenue, the number of board meetings held by the firm in the prior year, the firm's market-to-book value ratio, the firm's common stock monthly return standard deviation for the previous sixty months, the dividend yield for the firm, and property and plant as a percent of book value for the firm.

I use revenue to control for the possibility that larger firms might have greater resources that can be used to institute more intricate plans such as RPE. The research and development variable is normalized by revenue to control for the Clinch (1991) finding that high R&D firms benchmark their compensation programs to market and accounting based measures to a greater extent than low R&D firms. I use the number of board of director meetings during the year to control for the activity of the board of directors. More active boards should be more inclined to institute a compensation measure that involves a greater design and measurement. I use the market-to-book ratio to control for the growth prospect of firms. If growth prospects are large, then the financing constraints induced by the growth prospects may imply a greater inclination to compensate executives with non-cash methods such as restricted stock or options. In light of the discussion in Appendix A, this could have positive or negative effects on a firms' willingness to pre-commit. I use standard deviation to control for the risk of the firm's market equity returns. If replacement costs are important to a firm, with respect to the probability of losing an executive, then a volatile return stream that induces a volatile compensation stream might negatively affect a firm's willingness to commit to an RPE measure. I use dividend yields to proxy for a firm's ability to use cash payments as a major portion of its executive's compensation packages. Since cash payment plans that involve RPE do not introduce additional income statement costs over non-RPE related cash plans, then cash availability might have an impact on a firm's ability to choose an RPE measure. Finally, property and plant provide a measure concerning the maturity of a

firm. This might proxy for low growth firms that bias compensation plans away from equity based incentives and toward cash plans that are relatively easy to include RPE in compensation.

I collected data from firm proxies on file with the SEC for all firms in the S&P 500 (as defined in ExecuComp) for the Standard and Poor's defined year ending 2000.[6] For each proxy statement, I reviewed the Compensation Committee Report on Executive Compensation for committee intent on pre-commitment to RPE. I collected and summarized data for each major category of performance related compensation. If a firm stated that it was or will be using a relative performance based measure in either its grant calculations (pre-grant or post-grant), vesting conditions (pure performance based or accelerated performance), or post-grant payouts, then the firm qualified for using an RPE measure for the indicated portion of its compensation package. If a firm did not mention RPE in its Compensation Committee Report on Executive Compensation, but evidence was found in the company's compensation table and footnotes that it did, then that also qualified for RPE. I should note that some executives have specific compensation contracts that may alter the overall plan of a compensation committee. These contracts typically establish a guaranteed yearly compensation value or prescribe the progression and type of hiring grants to be made during the initial years in an executive's tenure. Therefore, while the contracts may offer exceptions to the overall methodology sanctioned by a compensation committee, the overall RPE goal of the committee is not expected to deviate materially from the proxy disclosure. I collected data for 462 firms in this manner.

As a proxy for industry homogeneity, mean partial correlation calculations were taken from Parrino (1997, p. 189). Parrino calculates partial correlation figures by

[6] The Standard and Poor's defined year for Year t runs from June 1 of Year t to May 31 of Year t +1.

regressing the monthly returns for each stock in the CRSP database from 1970 through 1988 against an equally weighted return index for each 2-digit SIC code as well as the equally weighted market return. He then averaged the partial correlation coefficient for each stock within the same 2-digit industry across a random selection maximum of 50 firms (minimum 35 observations) to arrive at the mean partial correlation (MPC) for each 2-digit SIC code. Following the procedure in Aggarwal and Samwick (1999b), I use the MPC data to calculate the industry homogeneity percentile for each 2-digit MPC. That percentile variable is denoted F(M). The largest MPC will have an F(M) value of 1.00 while the lowest will have a value of 0.00. While any updated mean partial correlation figures might change through time, it is assumed that the ranking of those figures would remain in an order very similar to that in the original calculations provided in Parrino (1997).

I collected market return and price information from CRSP and compensation and accounting data from S&P Compustat and ExecuComp. When combined with the necessary industry homogeneity data, the sample was reduced to 403 firms and then further reduced to 359 firms in the probit analysis where accounting, compensation, and market return data were required.

Summary Statistics

Table I presents the general characteristics for the sample. Although the sample consists of the largest firms in the United States, market value, market value to book value and revenue data are skewed. The median (average) total common stock value and revenue for the sample is $8.6 billion ($25.5 billion) and $5.2 billion ($11.4 billion), respectfully. More than 50% of the firms had 0% of sales as research and development expenses and the median (mean) dividend yield is 1.12% (1.59%). The median (mean) percentage of property and plant as a percentage of book value is 26% (29%). For both

the one' and two-year industry returns, the mean and median percentiles are above the 60th percentile. Therefore, the sample consists of a group of reasonably high industry performers. The minimums and maximums reflect that the sample includes some best performers within an industry but does not include any of the poorest performers in an industry. The fewest number of firms used to calculate industry relative performance results is 16 while the largest number is 1014. The median (mean) monthly standard deviation of common stock returns is 10.02% (11.01%) The mean and median industry homogeneity percentiles are close to .5, suggesting a reasonably symmetric distribution of firms in the total sample. The median (mean) number of board meetings in 2000 is 8 (8.12).

Table II (also see Figures 1 through 5) details the frequency of RPE among the sample firms. When RPE is confined to external industry related market measures, 94 firms pre-committed. Only 23 firms elected to have RPE influence their yearly bonus plans, while 79 utilized RPE for any long-term compensation. Of those 79 firms, 76 utilized RPE in their non-option related long-term choices and 57 firms utilized it in their long-term cash based plans. The predominant RPE tool is restricted stock/units and long-term cash based plans. These choices generate minimal income statement effects vis-à-vis non-RPE compensation versions of the same tools.

After industry RPE measures, accounting measures next meet the closest definition of a peer performance benchmark. When RPE is confined to accounting relative measures, the focus appears to shift to cash related plans. While 65 firms chose an RPE method involving any compensation tool, 40 chose for it to influence their bonus plans. With 32 firms pre-committing to RPE in their long-term plans, 21 did so in their long-term cash plans and another 8 pre-committed in restricted stock plans (long-term plans that exclude options are essentially restricted stock and long-term cash plans).

Therefore, out of the 65 firms that chose to pre-commit to an accounting relative measure, 61 chose that method for cash related plans. It appears that cash related plans are the predominant method of utilizing accounting based RPE. This is understandable because the purpose of many cash plans is to compensate executives for value contributions that may not yet be reflected in a market valuation.

Only 27 firms in the 403 firm sample use the broad market RPE measure classification. Of those, only 5 firms utilize it for bonus calculations while 23 utilize it in a long-term cash plan. As with accounting RPE plans, it appears that broad market RPE is primarily used for cash plan calculations. In this case, the proprietary information based argument is not valid. The most logical justification for broad market involvement in cash related plans, rather than in equity related plans, is based on utilizing a method that does not require onerous accounting treatment or does not greatly complicate the compensation plan.

When considering all forms of RPE based compensation that are benchmarked to any external accounting or market measure, 134 firms used RPE in any compensation delivery classification. When limited to bonus compensation, only 53 firms pre-committed to RPE, while 99 pre-committed for any long-term compensation component. Ninety-three firms utilized an RPE method for any long-term compensation component except options, while 69 firms used RPE in their long-term cash related plans. The simple frequency of RPE suggests that the most common compensation tool utilized is non-option related long-term compensation such as restricted stock/units and long-term cash based plans.

It appears that firms may choose to utilize RPE when the accounting implications for the RPE tool are not any more burdensome than the non-RPE version of that

compensation tool. This means that accounting frictions may be important when studying relative performance evaluation.

Industry homogeneity is central to the tests of Hypotheses I and II. Table III details the correlation of variables to the constructed homogeneity percentile while Table IV displays the correlation coefficients between all of the variables for the entire sample. In Table III, the sample is partitioned by firms that have pre-committed to a named RPE method and those firms that have not pre-committed. When broad market based RPE pre-commitment is the partitioning method, the market-to-book ratio is negatively correlated with a firm's industry homogeneity percentile for those firms that did not pre-commit, while the pre-commit sub-sample is not significantly correlated. A possible explanation for this is that there might be greater expected cumulative economic profitability in the future for the less homogeneous industry firms that do not pre-commit.

The correlation of firm revenue to industry homogeneity is also of particular interest. When industry relative measure pre-commitment is the partitioning method, the data indicates that revenues are negatively correlated with industry homogeneity in the pre-commitment case, but positively related in the sub-sample that did not pre-commit. It is premature to draw an inference from this simple result, but it indicates that the pre-commit sub-sample has lower revenues when competing in a highly homogeneous industry while the non-committal sub-sample does not seem to suffer from the same problem. While the result is not as distinct for the broad market RPE partitioning case, the pre-commit sub-sample is statistically negatively correlated with industry homogeneity. The all relative RPE partitioning case is similar to the broad market RPE results.

Looking at industry percentile return correlations, I find that the pre-commit sub-sample is negatively correlated with industry homogeneity (only when two-year

performance is utilized) while a correlation coefficient that is not statistically significant is found for the sub-sample that does not pre-commit. This suggests that lower industry-ranked performing firms come from higher homogeneity industries in the pre-commit sample but there is no apparent correlation with the sub-sample that does not pre-commit. It also further supports the analysis concerning firm revenues above.

For the standard deviation of returns variable, where industry and market RPE pre-commitment is partitioned, the non-committal sub-samples have a negative correlation between homogeneity and return volatility, whereas the pre-committal sub-samples are not statistically significantly correlated. This occurs despite the fact that the volatility for the pre-commit sub-samples is statistically higher than the volatility for the not pre-commit sub-samples (see Table V for a pre-commitment/no pre-commitment volatility summary analysis). The non-committal firms appear to operate with low volatility when in homogeneous industries while the committal firms do not. The only other notable difference in Table III concerns dividend yields. With respect to broad market commitment, the sub-sample that does not pre-commit has a statistically positive correlation between dividend yields and industry homogeneity, whereas the pre-commit sub-sample does not have a statistically significant correlation coefficient. This means that for the firms that do not pre-commit, free cash flow may be positively related to industry homogeneity. This is the opposite of what we would expect if homogeneity were positively related to the level of competition within an industry. Alternatively, it is consistent with the non-committal firms coming from a group of firms with a higher cash flow despite the fact that many compete in homogeneous markets.

Table III suggests that the relationship between a firm's industry homogeneity level and variables that are important to the RPE pre-commitment decision will differ based upon whether the firm pre-committed to RPE or not. The results are consistent

with lower performing firms having a greater inclination to pre-commit to RPE than better performing firms. They also indicate that the non-committal firms may be performing more successfully when in homogeneous industries than their pre-committal counterparts.

Table VI, Panel A (see Figures 1 through 5 also) partitions the firms into manufacturing and non-manufacturing groups. From the sample of 403 firms, 207 have manufacturing 2-digit SIC codes (20-39) while the remaining 196 are non-manufacturing SIC codes. The sample consists of 38 different 2-digit SIC codes with 16 representing manufacturing firms and the remaining 22 non-manufacturing firms. While the rate of pre-commitment to an RPE method appears to be somewhat larger for manufacturing firms when the accounting and market based methods are the choice, manufacturing firms pre-commit at a slightly lower rate for industry based RPE. Although manufacturing firms may pre-commit at a slightly higher rate, the mean (median) homogeneity percentile for the manufacturing sub-sample is .3083 (.2307) while that of the non-manufacturing sub-sample is .6647 (.7564) (not shown). This is particularly interesting because Panel B of Table VI shows that the mean homogeneity level of firms that pre-commit is significantly greater than that for firms that do not pre-commit to the industry and accounting based RPE classifications. This suggests that while the overall homogeneity of the manufacturing sample is lower than for the non-manufacturing sub-sample, there is enough "high homogeneity" manufacturing firm variation in the pre-commit sub-sample to generate a statistical difference in means shown in Panel B. The mean industry homogeneity levels for firms that commit to market based RPE shows no difference. This is not surprising because broad market based RPE choice is probably not directly related to industry ranked performance.

Hypothesis II predicts that better performing firms should be less inclined to institute an RPE mechanism. Table VII reviews the industry percentile returns for firms that pre-commit and those that do not. When industry return percentiles are based upon a one-year history, the data indicate no difference in performance for firms that pre-commit compared to those that do not pre-commit. However, when the data is based upon a two-year history, for industry based RPE the pre-commitment sub-sample has a significantly lower percentile return history than firms that did not pre-commit to industry based RPE. This may indicate that compensation choices are strategic rather than tactical. The accounting and broad market based RPE measures find no statistical difference, while the all relative based measures find a statistical difference that is driven by the industry based RPE measure. The accounting measure indicates no difference in industry return percentiles, and this may indicate that the reason for the accounting based benchmark is because the measure may contain information that is not expected to be impounded in efficient market prices. As the analysis proceeds we would then expect accounting based RPE to differ from industry based RPE on some important points.

Empirical Results

Table VIII, Panel A reports the probit model results using one-year industry percentile rankings as the performance metric to model the likelihood of an industry relative commitment. Industry homogeneity or F(M) is positive and significant when all compensation, all long-term compensation and long-term compensation without options are the compensation categories, while it is positive and significant at the 10% level for bonus. This is consistent with Hypothesis I. The one-year performance and one-year performance - homogeneity interaction terms are insignificant in all cases. This suggests that higher homogeneity industry firms are more likely to commit to an industry measured RPE method when it involves all of the compensation categories except long-

term cash. While long-term cash compensation works easily into RPE for accounting purposes, it is also primarily used in practice for multi-year incentive purposes. Therefore, a one-year measure of performance may not be closely related to the RPE pre-commitment decision. The data supports Hypothesis I but not Hypothesis II. Firm revenues appear to have no relation to the likelihood of a firm to pre-commit. This discounts the suggestion that there may be a critical firm size that is required to institute a complicated compensation plan. Research and development expenses appear to be positively related to pre-commitment for all long-term compensation measures as well as for all long-term cash compensation measures. This result is puzzling when we consider that it is the restricted stock portion of compensation in the data that appears to cause the insignificance in the long-term compensation without options category. This may be affected by the fact that restricted stock issuance precipitates an income statement expense that may be difficult for high research and development firms to incur. Clinch (1991) finds that research and development is positively related to equity related grants. Therefore, the results may indicate that high research and development firms may continue to make equity related grants but do so without RPE implementation. The number of board meetings is positively related to pre-commitment for non-cash items, indicating a higher level of board level activity for firms that pre-commit. This supports the view that firms that pre-commit tend to have more active boards. The market-to-book ratio coefficients are all significantly negative (weakly significant for long-term compensation without options and long-term cash compensation) for all categories except bonus compensation. It appears that firms with large growth options are less inclined to involve RPE in their long-term compensation plans. This may be because it is difficult to define an industry benchmark for these firms or because of the large income statement expense required by RPE in those cases. This agrees with the findings of Murphy (2001)

where his measure is book-to-market and is positively related to the likelihood that a firm will utilize a financial market standard versus an internal standard for compensation calculations. The mostly negative and significant standard deviation coefficients suggest that firms with higher levels of risk are less likely to pre-commit to an RPE method. If firm volatility impacts the likelihood of achieving a target level of compensation, then volatility might also negatively impact a firm's ability to retain an executive within an RPE compensation framework. It also supports Aggarwal and Samwick's (1999a) finding that executive pay-performance sensitivity is decreasing in the variance of the firm. Their result suggests that the power of incentives is decreasing in the variance of the returns of the firm. Dividend yield is weakly negatively significantly related to RPE pre-commitment for long-term cash plans. This appears to be related to the cash available for such plans. Property and plant is weakly positively related for bonus plans. This may suggest that for capital intensive industries there are better opportunities for clear short-term results measurement.

The accounting relative measures model, Table VIII, Panel B, finds a weak positive relation between the one-year performance - homogeneity interaction term for all long-term compensation and all long-term compensation except options. More homogeneous, better industry performing firms are more likely to institute accounting based RPE in a portion of their long-term plans. This occurs despite the insignificance of the performance and the homogeneity terms when taken separate. The only other variables that are significantly related are research and development (positive) and standard deviation (weakly negative for all long-term compensation and negative for long-term cash compensation). The research and development coefficients are at least weakly significant for all classifications. This reinforces the point that high research and development firms may be compensating executives for results that are not yet available

to the investing public. That point is further reinforced by the insignificant coefficients concerning the market-to-book value variable. This is not consistent with the market based RPE measures of Panels A and C. The negative relation of return volatility to pre-committing to some long-term plans suggests that RPE may induce replacement cost risk on firms that utilize RPE. This may imply that a retention concern is present. The result is consistent with Aggarwal and Samwick (1999 a). The evidence in Panel B is weakly supportive of Hypothesis I and II.

Table VIII, Panel C exhibits the results for the broad market relative commitment measure. The results suggest that more homogeneous, higher performing firms are less likely to pre-commit for all categories (the results are weakly significant in three of the cases) except bonus. However, homogeneity by itself does not appear to have an impact. Against the model's predictions, there is a weakly positive significant value for the all compensation category for the one-year industry percentile return. It suggests an increasing likelihood of RPE commitment by higher performing firms, when not controlling for industry homogeneity. Although it is weakly significant, it is investigated in an additional specification that utilizes a dummy variable to control for upper 50^{th} percentile firms. The evidence in Panel C is consistent with Hypothesis I but is mixed for Hypothesis II.

Table VIII, Panel D shows the probit model estimation when all forms of RPE are used at one time (industry, broad market, and accounting). The results suggest that homogeneity is the only variable of concern that has a positive relation to the likelihood of a firm to commit to RPE. That result is only significant for the "all categories of compensation" case. With respect to the control variables, research and development tends to be positively related to commitment while standard deviation is once again negatively related to RPE commitment. Market to book value is generally negatively

related to pre-commitment while the number of board meetings is weakly positive for only the all long-term compensation category. The all relative RPE measure specification results appear to suffer from different justifications in the use of industry versus accounting relative performance evaluation. Although very weak, the evidence provides some support for Hypothesis I.

While the results are weak when using one-year performance return percentiles, the evidence provides some support for both hypothesis. Since RPE is defined in the model as relative to a firm's industry peers, the most pertinent evidence should be found when commitment is classified in that manner. Gibbons and Murphy (1990) suggest that in some cases, the correct industry benchmark is difficult to find. The industry based measures find that homogeneity is more important, while performance has greater importance through the homogeneity-performance interaction term in the broad market specification. The positive coefficient for the one-year firm performance variable found for the broad market specification is investigated in Table IX.

Hypothesis II states that better performing firms should exhibit less of an inclination to pre-commit to RPE than weaker performing firms. Therefore, it may be incorrect to assume that there is a monotonic performance - pre-committal relationship throughout the industry performance spectrum. In order to investigate the possibility that firms performing in the top half of their industry pre-commit to RPE in a different manner than lower industry-performing firms, a modified specification is used.

Table IX shows the results where the one-year industry percentile return is interacted with a dummy variable that is equal to one if the firm performed in the top 50^{th} percentile of all firms in its industry and zero otherwise. The top 50^{th} percentile dummy variable enters the specification by itself and is also interacted with the one-year industry percentile return - homogeneity percentile interaction term. As we proceed, the focus

will be on the variables that directly concern Hypotheses I and II or where the new specification changes the results concerning the control covariates.

The results from this alternative specification for the industry RPE measure (Table IX, Panel A) also support Hypothesis I. Only the coefficients concerning the homogeneity level are positive and significant (weakly for long-term compensation and long-term compensation without options). They provide no support for Hypothesis II, as all of the performance coefficients are insignificant. Industry homogeneity is once again the only variable of concern that has a significant impact on the likelihood of committing to RPE.

The accounting relative results, Panel B, suggest an interesting change from the simple results in Table VIII. The homogeneity coefficients for all compensation and bonus have become weakly positive where they were insignificant in the simple specification. In addition, the performance-homogeneity interaction term for all long-term compensation and long-term compensation except options has now become insignificant when confined to the top half of the industry performance group. It appears that the lower-half performers are driving the result in Table VIII, Panel B where the better performing more homogeneous firms are more likely to pre-commit to a long-term accounting-defined RPE based mechanism. There is weak support of Hypothesis I, and Hypothesis II also has weak support but only if we consider the weaker firms in the sample.

Panel C in Table IX shows the interestingly positive impact of performance on broad market based RPE commitment. The dummy specification suggests that the positive impact of one-year firm performance found in Table VIII, Panel C is driven by the lower performing and not the upper 50th percentile firms. The dummy specification finds that for top 50th percentile firms, homogeneity and performance has no impact on

the likelihood of commitment. This suggests that for broad market based RPE commitment, the bottom 50th percentile firms are driving the results in Table VIII, Panel C. Although we must be careful not to draw premature conclusions, the results suggest that the lower performing firms are driving the RPE commitment results. We must also note that the level of broad market RPE is related to broad market adjusted performance rather than the industry-adjusted performance measure utilized in the performance measurement. We must therefore be critical of industry homogeneity results when discussing broad market related RPE. The results from Panel C, Table VIII, in conjunction with those in Table VII, imply that the lower performing firms weakly conform with Hypothesis II whereas the better performing firms appear neutral on the matter.

The all relative top-dummy specifications are similar to the simple specification and provide little additional insight.

The results from the probit models support Hypothesis I in that firms that are provided a more accurate signal of industry-ranked performance tend to be more likely to pre-commit to RPE when the RPE measure is industry-adjusted market performance.

Accounting RPE appears to contain a mild homogeneity effect while broad market RPE measures appear to be mildly supportive of the Hypothesis I predictions, but only for the lower performing firms in the sample. Hypothesis II is weakly supported when considering the weaker firms in the sample.

Commitment to any RPE form is negatively related to the standard deviation of firm returns. This indicates that riskier firms tend to be less inclined to commit to RPE.

Two-Year Performance Relations

Pre-commitment to RPE may be used by compensation committees as a strategic rather than a short-term tool. It may be important to consider a firm's industry rank over

a time period greater than one year when analyzing compensation design alternatives. If a board needs to alter a firm's compensation incentive drivers, then it is reasonable to assume that they would base their decisions on long-term competitive trends. In order to investigate that possibility, the simple specification utilizing two-year industry rankings is first shown in Table X and a dummy specification is shown in Table XI.

Table X reports the results using two-year rankings. The results generally find that RPE pre-commitment is related to the two-year performance data to a greater extent than when using the one-year performance data. The industry relative measures in Panel A support Hypothesis I and are mixed for Hypothesis II. The homogeneity coefficient is positive and highly significant when all compensation, all long-term compensation, and all long-term compensation without options are the compensation categories, while long-term cash compensation is positive and significant at the 10% level. The homogeneity-two-year percentile interaction terms are negative and highly significant in two of the five compensation categories, while the all compensation and long-term compensation without options are negative and significant at the 10% level. Higher performance-higher homogeneity industry firms tend to be less likely to commit to an RPE choice while greater homogeneity alone appears to increase the likelihood that an RPE mechanism will be irrevocably put in place. Note that the two-year percentile coefficients in columns (3) and (4) are marginally significant and positive. This weakly suggests that higher ranked firms, absent their industry homogeneity, are more likely to commit to an RPE method when that method involves equity related compensation tools. This is counter to the Hypothesis II predictions and is further investigated in a top performing dummy specification. The control covariates research and development, the number of board meetings, market-to-book value, standard deviation, and property and plant have the same direction and significance level as when the one-year performance data is used in

the analysis. The one exception is dividend yield (for long-term cash compensation) where the result is marginally significant for the one-year data and insignificant when using the two-year data.

The two-year return percentile specification for accounting relative RPE results in Panel B measures appear not to be related to industry homogeneity or industry based performance. While the homogeneity result is surprising, the performance result may be intuitive. Since accounting returns by design are intended to report single year results, we should expect to find that a longer-run market based performance result would not be related to a RPE pre-commitment, which is based upon an accounting measure.

The broad market results, Table X Panel C, using two-year percentile are similar to the one-year percentile specification. Pre-commitment is weakly related to the two-year percentile – homogeneity interaction term while apparently not related to homogeneity. The two-year industry percentile has a significantly positive relation to the likelihood of a bonus level commitment. This is surprising when we consider that most bonus plans are intended to compensate for a single year's performance. This is also further investigated with a dummy specification. The results weakly support Hypothesis II in that the better industry-performing, more homogeneous firms are less inclined to pre-commit to market base RPE measures.

The all relative measures RPE classification in Panel D is consistent with the results of the industry relative measure. The homogeneity coefficients for all compensation, all long-term compensation, all long-term compensation except options, and long-term cash compensation are positive and significant (not at conventional levels for long-term cash compensation). The two-year industry percentile - homogeneity interaction terms are negative and significant at the 10% level for all long-term compensation and all long-term compensation except options. The results for the two-

year industry percentile effects are insignificant in all cases. Panel D finds that more homogeneous firms tend to be more inclined to pre-commit to any form of RPE while the better industry-performing, more homogeneous firms tend to be weakly less inclined to pre-commit to equity based long-term incentives.

The results in Table X suggest that the high industry homogeneity firms are more likely to commit to an industry based RPE mechanism, usually through a long-term compensation choice. This supports Hypothesis I. The results also weakly support Hypothesis II because higher performing, more homogeneous firms are less likely to commit to broad market RPE than low performing, more homogeneous firms. If higher industry performance ranked firms have greater retention concerns, then the results support the Hypothesis I interpretation that firms with lower retention concerns will be more likely to publicly announce their intention to utilize an RPE method. The results concerning broad market based RPE suggest very weak support of Hypothesis II because performance, absent a homogeneity measure, appears to be weakly positively related to pre-commitment.

In order to investigate the positive relation that Table X found for the positive return percentile relationship to the likelihood of pre-commitment (for industry and broad market RPE measures), the dummy specification for top 50^{th} percentile firms is once again utilized. Table XI shows the results of that specification.

Table XI, Panel A shows that the two-year industry percentile return - top 50^{th} percentile dummy term is insignificant in all cases. This suggests that the positive inclination of better performing firms in Table X, Panel A, absent their homogeneity levels, to impose an RPE mechanism is not related to the upper 50^{th} percentile. In fact, it is the better performing firms in the lower 50^{th} percentile, independent of industry

homogeneity, that are more likely to pre-commit. The results provide support for Hypothesis I and II.

The accounting RPE measure, in Panel B, has one change from the simple specification in Table X. The coefficient on the homogeneity term is now weakly significant for all compensation and bonus. This change from Table X is apparently caused by the lower performing firm characteristics that are being picked up by the homogeneity factor rather than the homogeneity-performance factor in the simple specification. The dummy variable specifications provide weak support for an industry homogeneity factor in committing to accounting-based RPE compensation.

As with the one-year dummy specifications, the results for the broad market measure, Table XI, Panel C find that the lower 50^{th} percentile firms in the sample were driving the effects that supported Hypothesis II.

The all relative measures give results that are very similar to the simple two-year specification. Both Hypothesis I and II are supported.

Murphy (1999) mentions that RPE is increasingly popular in utilities and cyclical industries. Although he does not provide a formal definition of a cyclical industry, he defines a utility as any firm with a 2-digit SIC code of 49. As a robustness check concerning the Table XI analysis, a separate probit analysis (not shown) was analyzed where a dummy variable representing a firm from the utility 2-digit SIC code (49) was added to the Table XI specification. The results concerning the non-utility coefficients are the same with one exception. For accounting relative measures, bonus RPE is positively related to homogeneity while the more homogeneous better performing firms are less likely to pre-commit. Utilities do not appear to be driving the analysis. In fact, utilities appear to be less likely to pre-commit to an accounting measure bonus RPE plan because the coefficient is negative and significant for the utility dummy variable.

The results from the probit models support Hypothesis I that firms in more homogeneous industries tend to be more likely to pre-commit to RPE when the RPE measure is industry adjusted market performance. There is some weak evidence that firms in more homogeneous industries are also more likely to pre-commit to accounting and broad market based RPE. Hypothesis II is also supported because weaker performing, more homogeneous industry firms are also more likely to commit to compensation based RPE when it is benchmarked to a firm's industry. That evidence is much stronger when the industry ranked performance is measured over two years rather than one year. This provides some evidence of retention concerns in the pay-for-performance relationship in executive compensation. It also provides some evidence that compensation related decisions appear to be more related to long-term rather than short-term performance measures.

The broad market RPE measure appears to be related to homogeneity and to industry performance measures, but only for the lower 50th percentile industry firms in the sample. Top 50th percentile firm commitment appears to have little relation to either homogeneity or two-year industry return percentiles. One cause for this may be that firms are measuring their performance relative to the entire market rather than to an industry related market performance drift.

The results concerning the control covariates are also telling of the way RPE is utilized. In general it is found that research and development expenses and the number of board meetings are positively related to the likelihood of pre-commitment to a form of RPE. This is indicative of firm's rewarding executives for long-term results as well as the need for an active board to integrate an RPE mechanism. RPE commitment is generally negatively related to market-to-book ratios, firm return volatility, and dividend yields. This suggest that the greater growth prospects and risk characteristics of a firm,

the less the likelihood of pre-committing to RPE. The growth prospects aspect is easy to reconcile since many RPE based plans require cash that may be limited for high growth firms. However the negative relation to return volatility is counter to what some earlier theory based results would suggest if the volatility is not in the control of the executive. One explanation for this result is that return volatility may produce compensation volatility. If compensation volatility creates voluntary departure difficulties for firms, then those with high return volatility may be less likely to introduce high powered incentives, such as RPE, to their compensation schemes. This is similar to the Aggarwal and Samwick (1999a) findings.

Summary

The chapter provides evidence that an industry based RPE public pre-commitment occurs with greater frequency in more homogeneous industries; however, the more homogeneous an industry is, the less likely its top performers are to pre-commit. This provides evidence of an increased concern for executive retention at the higher industry performance levels where quality replacements may be expensive to identify and hire. Top performing firms, independent of their homogeneity level, are neither more nor less likely to commit to any RPE system.

Accounting based RPE appears be related to homogeneity or retention concerns for only the lower 50^{th} percentile performers. It is however negatively related to firm risk as with the other RPE measures.

Broad market based RPE commitment has a mild negative relation to pre-commitment for the more homogeneous, weaker performing firms in the industry. The empirical evidence is consistent with the prediction that retention concerns are integrated into the decision to pre-commit to RPE.

The evidence suggests that retentions concerns may be an important factor to the difficulty in documenting RPE such as in Antle and Smith (1986), Gibbons and Murphy (1990), and Ely (1991).

The financial market based results appear to be stronger when a firm's two-year industry performance is used to proxy for replacement costs versus one-year performance results. This is consistent with the suggestion that RPE compensation decisions are strategic rather than tactical tools.

Chapter 5: Clarity of Signal Tests in Post-Performance RPE Compensation

The previous chapter analyzed the likelihood of a firm pre-committing to a specific form of RPE when executive replacement costs vary. The results support the Chapter 3 prediction that high replacement cost firms will be less likely to pre-commit to RPE than low replacement cost firms. They do not, however, completely distinguish between committing to RPE for replacement cost reasons or for clarity of signal reasons. The model's prediction is concerned with ex ante pre-commitment and is not intended to apply to post-performance RPE pay-performance variation. That is because post-performance RPE will be the result of the explicit RPE pre-commitment choice as well as an implicit RPE choice where a firm may exercise its option to include RPE in its compensation levels at the end of the performance period without the burden of a pre-commitment choice.

The post-performance data creates an opportunity to discriminate between two competing homogeneity based arguments: 1) a firm competing in a more homogeneous industry will receive a more meaningful signal for its industry-adjusted performance and should therefore find RPE easier to implement after performance can be estimated, versus 2) better industry performers are subject to greater retention concerns than industry laggards and are therefore more concerned that the post-performance payouts to their executives are reconcilable to their firm's industry-adjusted performance. If RPE variation is related to the clarity of an RPE signal instead of replacement cost issues, then we would expect greater post-performance RPE for firms that compete in more homogeneous industries. If post-performance RPE variation is not related to

homogeneity, but is related to performance, then that would suggest replacement costs to be more important than signal clarity.

This chapter proceeds by testing the relationship between the post-performance (or ex post) pay between executives and their firm's industry-adjusted performance as well as the firm's degree of industry homogeneity. The higher performing sample should consist of the higher performing firms that have committed to RPE and then earned a higher calculated payout as well as the higher performing firms that did not commit to RPE and yet utilized their option after the performance period to compensate at a higher discretionary level in order to protect against losing an executive for compensation reasons. The lower performing sample consists of firms that pre-committed, and therefore had a lower compensation level, as well as firms that did not pre-commit who are free to compensate their executives with a base level of compensation that may have little relation to firm performance. That argument predicts that higher performing firm executives should have greater RPE in their ex post payouts than lower performing firm executives. It also predicts a lessened effect from clarity of signal issues.

With the premise that replacement costs will play an important role in implementing compensation RPE, Hypothesis III is presented to help discriminate between the clearer signal argument and the retention cost argument.

Hypothesis III: If firms are in need of a more meaningful signal in order to successfully implement a relative performance mechanism in their compensation plans, then the ex post pay-performance relation in more homogeneous industries will exhibit greater RPE than for firms from less homogeneous industries.

A rejection of Hypothesis III will not be sufficient to provide support for the central role of replacement costs in RPE implementation. Support for the replacement costs argument also requires that industry-adjusted performance is important to whether a firm compensates in a manner consistent with RPE or not.

Empirical Setup and Data Description

The ex post empirical tests concerning Hypothesis III generally follow the specification of Aggarwal and Samwick (1999b). Instead of regressing compensation on industry adjusted firm returns, the independent variables are the firm's dollar returns and the dollar returns on the firm's industry (the index). This specification will indicate RPE if there is a negative coefficient for the index returns. The benefit to this specification is that the pay-to-own-firm-performance relationship can also be estimated. RPE is tested in this study for variation related to changes in levels of performance and homogeneity. In the ex post analysis, homogeneity will serve primarily as a proxy for the clarity of the performance signal received by the firm. The initial specification is as follows:

$$w_{ijt} = \eta_0 + \eta_1 \pi^0_{jt} + \eta_2 \pi^r_{jt} + \eta_3 F(H_j)\pi^0_{jt} + \eta_4 F(H_j)\pi^r_{jt} + \eta_5 F(H_j) + \eta_6 F(M_j)\pi^0_{jt} + \eta_7 F(M_j)\pi^r_{jt} + \eta_8 F(M_j) + \eta_9 CEO_{it} + \sum_{t=94}^{00} \psi_t + \varepsilon_{ijt} \quad (36)$$

where,

w_{ijt} = compensation in thousands (total direct compensation, TDC1) received by executive i at firm j in year t.

π^0_{jt} = the total 1995-level adjusted dollar (millions) return to all shareholders of firm j during period t-1 to t.

π^{r}_{jt} = the total 1995-level adjusted dollar (millions) return from investing an amount equal to the total common stock value of firm j at time t-1 in an index composed of value weighted firms in the same 2-digit industry as firm j during period t-1 to t. The index is rebalanced monthly.

$F(H_j)$ = the cumulative density function (percentile) value associated with the Herfindahl index value for the 4-digit SIC code that is firm j's primary line of business.

$F(M_j)$ = the cumulative density function value (percentile) associated with a mean partial correlation for the 2-digit SIC code that is firm j's primary line of business.

ψ_t = a dummy variable to indicate whether the compensation was received in 1994 - 2000.

CEO_{it} = a dummy variable indicating whether executive i is the CEO during period t.

The specification is designed to test whether firms are filtering out (indexing) the returns of their own industry when they make their payouts or grants to their executives. If firms filter for the industry drift in their returns, then η_2 would be negative. If it is related to either the level of industry competition or the level of industry homogeneity, then η_4, or η_7, respectfully, will be negative.

Compensation and firm return performance is denominated in dollars (compensation is in thousands, while firm performance is in millions) in order to provide

a sharing rule interpretation. The Herfindahl data is utilized in the initial specification in order to provide a baseline comparison to Aggarwal and Samwick (1999b). Industry homogeneity is included per the prediction of Hypothesis III. Year dummies are included to account for increases in compensation related to time trends rather than to a firm's performance and a dummy to control for CEOs, who generally earn more than non-CEOs.

Equation (36) also includes the following control variables: revenue, research and development as a percentage of revenue, market-to-book value, monthly standard deviation of equity returns for the firm for the preceding 60 months prior to time t, an indicator variable when the executive is a member of the board of directors, the number of board meetings, and property plant and equipment as a percentage of book value. In addition to the discussion below, prior research has indicated that these factors might impact compensation decisions.[7]

Revenue is included to control for increased levels of compensation related to span of control factors. Per the Chapter 4 finding that research and development is positively related to a firm's inclination to pre-commit to RPE, it is also included in the ex post analysis. Market-to-book ratios and standard deviation of firm returns were found to have a negative relationship with pre-commitment and are appropriately included in the ex post analysis. The board member variable is included to control for the higher levels of compensation awarded to executives whose importance to the firm is great enough to merit a seat on the board. The number of board meetings is included to control for the positive inclination of more active boards to enact pre-commitment RPE. Finally, property and plant as a percentage of book value is included to account for any differences in compensation that occur for firms with a large assets-in-place strategy.

[7] See Murphy (1998). In a specification not shown, a variable is introduced to control for the equity-based holdings of each executive in his or her firm. The holdings variable did not affect the results.

An additional specification is used to check for changes in compensation:

$$\Delta w_{ijt} = \eta_0 + \eta_1 \pi^0_{jt} + \eta_2 \pi^r_{jt} + \eta_3 F(H_j)\pi^0_{jt} + \eta_4 F(H_j)\pi^r_{jt} + \eta_5 F(H_j) + \eta_6 F(M_j)\pi^0_{jt} + \eta_7 F(M_j)\pi^r_{jt} + \eta_8 F(M_j) + \eta_9 CEO_{it} + \sum_{t=94}^{00} \psi_t + \varepsilon_{ijt} \quad (37)$$

Equation (37) is also adjusted for the control variables previously mentioned.

If industry homogeneity has an effect on firm use of RPE, then $\eta_7 < 0$ in equations (36) and (37).

While Aggarwal and Samwick (1999b) used median regressions in the majority of their paper, I use OLS with standard errors robust to intra-company covariation in this analysis. If industry-adjusted performance is central to ex post RPE use, then we should expect higher performing firms to utilize RPE in a different manner than weaker performing firms. Therefore the skewed compensation data evident in Table XIV may contain meaningful information that OLS will not de-emphasize. The time series data is pooled.

Data

The tests utilize the same methodology as Aggarwal and Samwick (1999b) and consequently utilize a similar data set and time period (1993-1995) as well as more recent data (1994-2000). The market return data is from the Center for Research in Security Prices (CRSP) database. Compensation data from Standard and Poor's ExecuComp database is combined with data from Compustat and with Herfindahl data from the Commerce Department's Census of Manufacturers. As in Chapter 4, industry homogeneity calculations are from Parrino (1997, p. 189) and are converted to a sample cumulative distribution function value (percentile) for each 2-digit mean partial correlation coefficient to create the variable F(M), or homogeneity percentile. A similar

calculation is made for the Herfindahl indices. That data is provided at the 4-digit SIC-code level and is then used to calculate the Herfindahl percentile variable or F(H). F(H) is included in the early regressions to ensure that it is not highly correlated with F(M). Although not reported in the tables, the Pearson Correlation Coefficient for F(M) and F(H) is -.1508 for the sample. It seems unlikely that the homogeneity variable is a proxy for the level of competition in an industry. The Herfindahl data is available for 4-digit manufacturing SIC codes 2000 through 3999 and therefore cannot be used to analyze the non-manufacturing data.

The ExecuComp data set includes compensation information for the top five compensated executives of a firm (one of which must be the CEO), ranked by salary plus bonus. The sample includes data for firms in the S&P 500, S&P Midcap 400, and S&P SmallCap 600 which I will collectively call the S&P 1500. The data include firms in the 1993 through 2000 years as defined by Compustat.

Summary Statistics

The summary statistics for the firms in the sample are provided in Table XII. Both the market-to-book ratios and revenue data are heavily skewed because the sample consists of the very largest firms in the U.S. as well smaller firms with very high valuations compared to their book values. Less than fifty percent of the firms had research and development expenses, but the heavy distribution skew produced an average revenue multiple of 12.15%. The data appear to be heavily skewed for growth value, size, and research and development. This is partially a result of the mix of very large and very small public firms in the sample. The average (median) property and plant as a percentage of book value was 31.36% (25.45%). The mean (median) sixty-month standard deviation of returns was 10.61% (9.52%). The homogeneity and Herfindahl percentiles are fairly symmetric, with means close to the 50th percentile in both instances.

There are on average 7.24 board meetings per year with a median of seven meetings. Of the CEO data points, about 99% of the CEOs were also on the board of directors.

Table XIII lists the correlation coefficients between all of the variables used in the analysis. Note that industry homogeneity is negatively correlated with levels of compensation, as well as with dollar returns to firm and dollar returns to the industry index, research and development, and the common stock return volatility. This is the expected result of an industry with many similar products and services.

Table XIV compares the compensation summary data for 1995 to 2000, stated in December 1995 dollars. While compensation has increased in all categories by a considerable amount, the largest increases occurred in the option portion of long-term compensation. CEO median (mean) total compensation increased from $1.307 ($2.257) million to $2.327 ($6.363) million for an increase of about 78% (182%) during the period. Short-term compensation increased from $.76 million ($1.052 million) to $.862 million ($1.352 million) or about 13% (29%) during the period while long-term compensation increased about 147% (316%). Of that, median (mean) option grants increased by about 237% (389%). As a percent of total compensation, long-term compensation increased from about 36.7% (36.8%) of the total package in 1995 to about 55.8% (51.8%) in 2000. While this is consistent with greater pay-performance sensitivity for the sample, it is also consistent with firms endeavoring to increase the target level of pay for executives with minimal income statement expense.

The non-CEO sample finds a similar trend. Median (mean) total compensation increased about 72% (158%) during the period while the short-term component increased 23% (40%) reflecting greater cash compensation percentage increases for non-CEOs than for CEOs. The long-term component increased by 188% (287%) during the period and is primarily composed of a 277% (377%) increase in the size of option grants. The greatest

percentage increases came from long-term compensation components. Long-term compensation was 30.5% (32.1%) of total compensation in 1995 and increased to 49.8% (48.1%) in 2000.

Executive compensation increased at a much faster rate than inflation during the period. The simple statistics suggest that firms shifted a greater percentage of total compensation to long-term (performance related) components, and options in particular. Option related compensation is a tool that generally has the weakest RPE component. This should make RPE more difficult to detect in the sample as the firms age. From 1995 to 2000, the non-CEO compensation increases are similar to the CEO compensation increases. If the large increases in compensation were indicative of the demand for high-powered talent, then the demand for sub-CEO talent was also high.

Also of interest, both sub-samples show that more than 75% of the observations did not grant restricted stock/units. As discussed in Appendix A, while restricted stock/units are expensed in all cases and should therefore be RPE neutral, it is not a compensation delivery choice for the majority of the firms in the sample. This should also limit RPE documentation in the sample.

Empirical Results

The total compensation results for manufacturing firms are presented in columns (1) – (4) of Table XV. The specifications in columns (1) and (2) utilize Herfindahl percentiles, F(H), in order to compare to the results to those of Aggarwal and Samwick (1999b). The results are similar to Aggarwal and Samwick except that those in Table XV are less statistically significant. One departure from their results is in column (1) where F(H) is positive but insignificant and the dollar returns to firm - F(H) interaction term is

also insignificantly positive.[8] The Table XV specification finds that the dollar returns to industry index - F(H) interaction term is negative and significant. The magnitude of the index - F(H) interaction term is large enough to indicate that at high levels of F(H), complete filtering of the industry return (or RPE) may be occurring where it was not in Aggarwal and Samwick (1999b). The difference in results may be caused by using 2-digit SIC codes to construct the index returns, while Aggarwal and Samwick calculate index returns using 3' and 4-digit SIC codes. Another alternative is that the data set covers 1993- 2000, while the Aggarwal and Samwick data stops at 1995. A similar comparison can be made for the change in compensation specification in column (2) of Table XV.

With respect to industry homogeneity, F(M), the specifications in columns (1) and (2) suggest that homogeneity has no relation to industry return filtering, while the F(M)-dollar returns to firm are negative and weakly significant. This counter-intuitive result suggests that compensation is negatively related to firm performance at higher levels of industry homogeneity. Further analysis suggests that this may be caused by the weaker performing firms in the sample where the performance-compensation relation may be different than for better performing firms. Note that throughout the regression analysis, the number of observations is quite large. In Table XV there are as many as 23,600 observations. With such a large number of observations, the statistical tests may find significant results that might not occur with a smaller, more reasonable number of observations. One means for adjusting for this problem is to require a higher statistical significance threshold. However, in the tests that follow, the homogeneity-related filtering variables are not generally significant at conventional test levels while the index filtering variables are significant at high test levels. Therefore, the results that follow

[8] Aggarwal and Samwick (1999b) find that the own performance interaction term is positive and significant while the index interaction term is negative and significant.

should be robust to reasonable adjustments for the large number of variables in the samples.

The results in columns (1) and (2) of Table XV provide no support for industry homogeneity in RPE. They do indicate a mild form of RPE but only for firms with very little competition in their industry.

While Aggarwal and Samwick confine their analysis to manufacturing firms where U.S. Census Bureau data is available, this study investigates homogeneity and retention effects on non-manufacturing firms as well. Columns (3) and (4) in Table XV show the results from the specifications listed in equations (38) and (39) for the manufacturing firms in order to investigate the effects of excluding the Herfindahl data as necessitated when the entire sample is analyzed.

$$w_{ijt} = \eta_0 + \eta_1 \pi^0_{jt} + \eta_2 \pi^r_{jt} + \eta_3 F(M_j)\,\pi^0_{jt} + \eta_4 F(M_j)\,\pi^r_{jt} + \eta_8 F(M_j) + \eta_9 CEO_{it} + \sum_{t=94}^{95} \psi_t + \varepsilon_{ijt} \tag{38}$$

$$\Delta w_{ijt} = \eta_0 + \eta_1 \pi^0_{jt} + \eta_2 \pi^r_{jt} + \eta_3 F(M_j)\,\pi^0_{jt} + \eta_4 F(M_j)\,\pi^r_{jt} + \eta_8 F(M_j) + \eta_9 CEO_{it} + \sum_{t=94}^{95} \psi_t + \varepsilon_{ijt} \tag{39}$$

Although additional data is available when not utilizing the Herfindahl related variables, the sample size is kept constant for comparability. Comparing columns (3) and (4) to (1) and (2) shows that the results are altered in three respects. First, the homogeneity coefficient that was negative and insignificant is now negative and marginally significant in column (3). Second, the dollar returns to firm - homogeneity

interactive terms have changed from negative and marginally significant to insignificant. Finally, the dollar returns to firm variable has weakened in significance for the levels specification, while it has stayed positive but has become significant in the changes in compensation specification. For the regressions with and without the Herfindahl index data, the dollar returns to industry index - homogeneity percentile interaction terms are insignificant. This suggests that industry homogeneity is not consequential to firms when filtering for industry return drifts. The results are the same for the specifications that include the Herfindahl data as well as those that do not. To get some perspective concerning the sharing rule that the firms in the sample are collectively employing, the levels specification finds that for each $1,000 in shareholder wealth that is created, an additional 5.7 cents of compensation is paid to the executive, while the changes specification shows the sensitivity to be about 8.2 cents.

For the control variables, the results are generally consistent with expectations. Compensation levels and changes are positively related to whether the executive is the CEO as well as the level of revenues for the firm. Both suggest that larger responsibilities are rewarded with larger levels and changes in levels of compensation. That is consistent with Aggarwal and Samwick (1999b). Research and development is negatively related to the levels and changes in compensation but only for the non-manufacturing sample. The manufacturing sample contains research and development coefficients that have the same sign but are not as significant as with Aggarwal and Samwick (1999b). One explanation for the difference could be the wider defined index that I have used compared to the narrower defined indices for their sample. However, Himmelberg and Hubbard (1999) find research and development to be positively related to the level of compensation. One difference between the results is that Himmelberg and Hubbard use very parsimonious models in their empirical work. The additional control

variables in my study might account for the difference. If research and development expenses proxy for the demand for specific human capital, then my results are not consistent with retention concerns in compensation arrangements. Market-to-book values are positively related to compensation. That is not surprising because market values are a cumulative measurement value for firm historical returns. In addition, Smith and Watts (1992) find that firms with more growth options generally compensate their executives at a higher level. Standard deviations are negatively related to compensation levels and changes. Manufacturing firms appear to be providing incentives to reduce firm return volatility. This is somewhat consistent with Aggarwal and Samwick (1999a) where firms with volatile return streams have a reduced pay-performance sensitivity. Executives who are board members tend to be paid more and get larger raises than their non-board counterparts. This is the opposite of the Aggarwal and Samwick finding. However, since executive board members are generally perceived to be central to a firm's strategic operation, I believe that the higher pay result is intuitively correct. Compensation is positively related to the number of board meetings that occur during the year. This suggests that the number of board meetings required throughout the year may be related to the amount of effort required by an organization. The result is also consistent with Aggarwal and Samwick (1999b). Property and plant is negatively related to levels and changes. An explanation for this is that property and plant may be a proxy for a reduced span of influence for firms where there are a large number of assets in place.

The non-manufacturing compensation data exhibits little relation to any form of indexing. Homogeneity is positively and significantly related to both the levels and changes in compensation. The sign of the homogeneity coefficients are positive for non-manufacturing, but negative for manufacturing firms. This may indicate that the fundamental compensation relationship for non-manufacturing firms differs from that of

manufacturing firms. Alternatively, industry homogeneity in manufacturing may indicate less of a requirement for specific expertise while it has a different meaning for non-manufacturing firms. There is also a different effect for the two sub-samples indicated with a positive non-manufacturing coefficient for return standard deviation. This means that risk reduction incentives are provided in manufacturing firms while they are not in non-manufacturing firms. For compensation levels and changes, all of the dollar returns to industry index related coefficients are insignificant.

The results from Table XV suggest that industry homogeneity has little impact on the decision for a firm to compensate with respect to RPE. In fact, once the Herfindahl data is excluded there is no indication of an industry filtering effect. The manufacturing data does not support Hypothesis III. While the non-manufacturing data also does not support the hypothesis, no evidence of industry filtering is provided.

The Total Cash Compensation (TCC) specification results are shown in Table XVI. The results are similar to those for total compensation data, with the exception that for the non-manufacturing sample, the changes in cash compensation specification indicates a weak anti-indexing effect for higher homogeneous firms. This is puzzling because the coefficients on the own firm returns are insignificant. Lewellen, Loderer, and Martin (1987) explain that compensation should be viewed as a balance between short-term and long-term incentives. Although it is important to view the entire compensation package, the result indicates that non-manufacturing firms may be shifting compensation delivery from longer-term compensation to cash. In the process, they appear to be rewarding more for industry good fortune than for firm performance. The results are consistent with Janakiraman, Lambert, and Larcker (1992), where little evidence of RPE is found in salary and bonus compensation data.

High and low performing firms may compensate their executives through formulae that are affected differently by minimum compensation level guarantees. If true, then by forcing top and bottom industry performer effects onto the same performance variable, the regressions will dilute the RPE results that are being measured. Table XVII utilizes the same specifications of columns (3) through (6) of Table XV with the added introduction of a dummy variable that is equal to one if the firm has performed in the top 50th percentile of its 2-digit SIC code and zero otherwise. The top dummy variable is then interacted with the dollar returns to firm, dollar returns to industry index, homogeneity, dollar returns to firm - homogeneity, and dollar returns to industry index - homogeneity variables in order to isolate the effects of top performers on the variables.

The manufacturing and non-manufacturing data is combined for columns (1) and (2). For both the levels and changes in levels specifications, top performing firms have a positive pay relation to firm returns and a negative relation for index returns. For example, where a lower 50%ile firm would actually lose 36.5 cents of compensation per $1,000 of firm return, the top 50%ile firms would benefit by a net amount of 23.1 (-36.5 + 59.6) cents per $1,000 of firm dollar return. The homogeneity interaction coefficients are not significant. The negative dollar returns to firm coefficient implies that the weaker performing firms in the industry may be disconnecting compensation from their own firm performance. The dollar returns to industry and dollar returns to industry - top interaction terms are also opposite signs in column (1). The results suggest that the top firms filter out the industry return, whereas the weaker performing firms compensate for the industry return (for changes in compensation only). Homogeneity tends to increase both levels and changes in compensation for the top performers in an industry. However, homogeneity has no impact on the use of RPE or the firm dollar return relationship. The results do not support Hypothesis III. In addition, top performing firms appear to filter

for industry returns more than bottom performing firms. The degree of filtering is not related to industry homogeneity. The evidence for the all- firm sample suggests that the clarity of the RPE signal is not central to the RPE decision. It is also consistent with replacement costs being central to the RPE decision.

Columns (3) and (4) use the prior specification with the manufacturing data subset. The tendency for top performers to filter out the industry return and compensate for firm returns, absent a homogeneity interaction effect, is similar to the all-firm sample. However, for the levels regression in column (3), homogeneity has an impact on the own firm pay-performance relationships. The top 50^{th} percentile industry-performing, more homogeneous firms have a negative pay-performance relationship with their own firm returns, whereas the lesser performing firms have a positive relationship. Also logically reversed is the positive coefficient for the dollar returns to industry index – homogeneity - top interactive term, which means that a portion of the index return was given to these executives and not filtered out. It appears that top performing firms are filtering out the industry return, yet the top performing, more homogeneous firms are reversing out that industry filtering. The positive effect of industry homogeneity on the level and changes in compensation is again positive for the top performers. The coefficients on the standard deviation terms are negative, indicating an incentive to reduce firm risk in the manufacturing sample. The evidence weakly rejects Hypothesis III because more homogeneous firms did not exhibit greater RPE. In fact, industry filtering is being reversed for the more homogeneous, better performing firms. RPE is once again more prevalent in higher performing firms.

The non-manufacturing data in columns (5) and (6) suggests a similar trend. As with the manufacturing sub-sample, the higher performing non-manufacturing firms tend to be compensated positively for their own-firm returns where the poorer firms tend to

have a negative relationship to such returns. Only the levels specification in column (5) finds industry return filtering for the top firms (at less than conventional levels of significance). Homogeneity once again tends to positively affect both the levels and changes in compensation with no relationship to industry filtering or own-firm performance based compensation. Only the levels regression finds a positive weakly significant relationship between risk and compensation. This indicates a weak incentive to incur additional firm risk. Columns (5) and (6) do not support Hypothesis III.

The results in Table XVII suggest that firm performance has the greatest impact on the RPE compensation relation. Homogeneity has very little impact and tends to work against ex post RPE measurement when it has an impact.

As a robustness check concerning the covariation of compensation among executives within a firm, an additional cross-section of the data is analyzed. First, CEOs and non-CEOs are split into separate samples. Then the non-CEO sample is aggregated and averaged to create a single non-CEO data point for each firm for each year the firm appears in the sample. Finally, the specifications in Table XVI are utilized for the two samples and are shown in Table XVIII.

For the CEO levels specification in column (1), the earlier findings are confirmed. Top performing CEO compensation has a positive relationship with firm performance whereas the compensation of the lower performing firm CEOs does not. The top performing CEO compensation levels exhibit some index filtering while the general sample population shows the reverse. Homogeneity has a positive relation with the level of CEO pay for the general sample population. In the changes in compensation specification shown in column (2), the results are similar but slightly weaker. Homogeneity has a positive impact on the size of the changes in the general CEO population with an additional positive impact for the top performing CEOs. For CEOs,

industry return filtering occurs for the top performers but it is not related to the level of industry homogeneity for the firm. This provides evidence against Hypothesis III and is also consistent with RPE being related to replacement costs.

For the non-CEO aggregated sample, the levels specification in column (3) also confirms the earlier findings. Top performing firms have a positive and highly significant dollar returns to firm coefficient whereas the weaker firms have coefficients with significantly negative signs. Similarly, the top performing firms have a negative and significant dollar returns to industry coefficient. It is positive for the general population in the levels specification. The top performing firms receive a higher level of compensation if they are in more homogeneous industries.

In the changes in compensation specification in column (4), the results are significant only for the dollar returns to firm variables. The coefficient on the dollar returns to firm - top interaction coefficient is positive and highly significant, while the result for the weaker firms is negative. As with the levels specification, homogeneity for the top performing firms has a positive and significant relation to the changes in compensation. The non-CEO data also provides evidence against Hypothesis III while also indicating that replacement costs impact the level of ex post RPE that a firm exhibits.

While the results in Table XVIII are not as definitive as in prior tables, they are indicative of the same general trends. Top performing firms (those performing in the top 50^{th} percentile of their 2-digit SIC code industry) exhibited a greater pay-for-performance relationship to their own firm performance, but they also exhibited a greater filtering tendency for their industry performance. RPE was found for top performers but not for the lower 50^{th} percentile performers. In only one circumstance did homogeneity have an impact on RPE, and the impact was the opposite required for RPE. The results do not support Hypothesis III because homogeneity does not appear to impact ex post measured

RPE. Higher performing firms tend to exhibit more ex post RPE than lower performing firms.

An interesting aspect of the results is that lower 50th percentile firms have a pay-performance relationship that is at times negatively related to their own firm performance and positively related to their industry index performance. From a pay-performance perspective, this may indicate that for lower performance percentile firms, the pay-performance relationship breaks down in favor of minimum guaranteed compensation levels that rewards performers but does not reduce compensation for poor performers. A simple representation of what this might look like is shown in Figure 7. The figure clearly describes a limited liability contract.

An additional OLS analysis concerning the behavior of firms, conditioning upon pre-commitment/no pre-commitment is provided in Table XIX. The S&P 500 sample of firms used in the Chapter 4 analysis is analyzed for their pay-performance relationships. Due to the availability of compensation and accounting related data, the sample allowed analysis for the 2001 Standard & Poor's defined year. Columns (1) and (2) concern firms that pre-committed to RPE while columns (3) and (4) concern the remaining firms in the sample that did not commit to RPE.

Some summary data will first be helpful in interpreting the data. From the sample that pre-committed to RPE, the sample is once again sub-categorized according to whether the firm performed in the top 50%ile of its industry or not. The correlation coefficient between the total one-year change in total direct compensation and firm dollar returns, as well as industry index returns, is then calculated.[9] For the pre-committal sub-sample of firms that performed in the top 50%ile of their industry, the correlation

[9] Total compensation is used in order to capture the value of changes in all levels of compensation. While this will include all compensation changes, it would be difficult to omit a portion of compensation on the grounds that it was not related to performance.

coefficient concerning index dollar returns is -.4837 and highly significant while the value for firm returns is insignificant. For the lower 50%ile firms, the correlation coefficient between changes in compensation and firm returns is -.1684 and significant at the 95% level, while the value for index returns is insignificant. Based on simple statistics, it appears that the top performing firms were more likely than poorly performing firms to pay in a manner that is consistent with RPE. This also appears to conform with the representation in Figure 7. The correlation between the dollar changes in compensation and a modified measure of the firm's industry percentile improvement was also calculated.[10] The correlation coefficient between percentile improvement and the change in total compensation for the poorly performing firms was insignificant while the value for the top performing firms is -.1320 and significant at the 95% level. This result is counter-intuitive. One explanation for this might be the result of a down market that was also in the midst of a corporate governance crisis.

The complete set of regressions for the regrouped sample are found in Table XIX. For the complete pre-committal sample, the homogeneity-own firm/index return coefficients are not significant in either the levels or changes regressions. The sub-sample conditions upon a higher level of industry homogeneity and this may be one cause for the result. For the levels regression, the firm pay-performance coefficient is positive with the top pay-performance variable insignificant. It appears that top performing pre-committal firms do not have a greater firm pay-performance payout than the weaker firms. In addition, top-performing pre-committal firms filter out the index to a greater extent than the lower performing pre-committal firms. For the changes in compensation specification, the results are much weaker but with the general conclusion that higher performing firms filter out the industry index to a greater extent than the bottom

[10] The value is calculated as the difference between a firm's one-year industry performance percentile and the firm's two-year figure. If a firm made an improvement, then the value would be positive.

performing firm (the bottom performing firms do not filter). The results suggest that firms that pre-commit to RPE are compensating in a manner that is consistent with RPE in the levels of compensation, while only the top performing firms are RPE consistent in the changes in compensation relationship. Pre-committal firm top-performers filter to a greater extent than bottom performer without regard to industry homogeneity. The results suggest that pre-committal firms are serious in their commitment to compensating via an RPE formula.

For the firms that did not pre-commit to RPE, the results are different. For the levels specification, the data finds no evidence of RPE. Interestingly, bottom performing firms appear to pay negatively for own-firm performance while the top performing firms attempt to cancel out this effect with a close to net neutral firm-performance relationship. As with the 1993-2000 sample, it appears that poor performing firms are providing a baseline level of compensation to their executives. The changes specification suggests a similar finding with respect to own firm performance. However, the homogeneity - firm return and the homogeneity - index interaction terms are weakly significantly positive and negative, respectfully. These signs are consistent with positive own-firm-pay positive sensitivity and negative industry-pay sensitivity for the more homogeneous firms in the non-committal sub-sample. It appears that more homogeneous firms are filtering the changes in compensation to a greater extent than less homogeneous firms. This result is consistent with Hypothesis III. This suggests that the clarity of the signal is related to the degree that compensation-based RPE is utilized for firms that did not pre-commit to RPE. From Table VI, note that the mean homogeneity percentile for firms that did not pre-commit is .4469. This suggests that the total industry dollar return that is paid to executives, at the mean, is –4.32 cents per thousand dollars of index dollar return (.261214 + (-.6811044 X .4469)). This effectively means that the more homogeneous

firms are neutralizing the industry-return giveaway and the less homogeneous firms are granting the industry return to their executives. Industry return filtering appears to be related to the clarity of the signal available in a more homogeneous market. While this result occurs for only the changes in compensation, it does indicate that the clarity of the signal that a firm receives concerning its industry adjusted performance is important to the degree that RPE is instituted in the post-performance pay relation.

The results should be compared to the 1993-2000 sample results where homogeneity did not have a significant relationship concerning the degree of post-performance RPE that was measured. A few interpretations of this result must be considered. One possibility is that the 2000 sample occurs in the corporate governance crisis of 2001. The effect of such a crisis on retention concerns is outside of the Chapter 3 model but it is plausible that in such an environment, executive retention concerns may become secondary. A second possibility which can be ruled out is that when pooled, the effect of homogeneity on the pre-committal and non-committal samples have opposing effects that cancels out in the pooled regression. As a robustness check (not shown) the two 2001 sub-samples were pooled. The homogeneity effect on filtering out the index remained in the changes in compensation sample. Therefore, the effect of homogeneity on filtering appears to be a result of the 2001 sample and is not an artifact of mixing the pre-committal and non-committal samples.

Based on the results, the clarity of signal argument for the effect of homogeneity on RPE cannot be ruled out even though it has an insignificant effect on the levels regression. Equivalently, replacement costs must also be considered when analyzing post-performance RPE implementation.

Summary

This chapter provides mixed evidence that higher performing firms exhibit greater post-performance RPE than lower performing firms. It provides evidence that top and bottom performing firms may utilize RPE differently and that it is necessary to control for performance when documenting RPE. Without properly controlling for performance, very weak RPE is found. This may be an explanation for the results found in Antle and Smith (1986), Ely (1991), and Gibbons and Murphy (1990).

Separate sample results suggest that performance is a factor for whether firms implement RPE but they also suggest that the clarity of an RPE signal is also important to whether RPE is implemented ex post.

Using industry performance ranking as a proxy for firm retention costs in a sample of S&P 1500 firms, where higher performing firms should have greater retention concerns than weaker performing firms, the results suggest an interesting aspect to the RPE story. The evidence in Chapter 4 suggests that weaker performing firms (which also have a greater need to improve their industry measured performance) have greater retention flexibility to incorporate and commit to an RPE based compensation plan. However, the sample provides evidence that the stronger performing firms (which have a reduced need to improve their industry performance) may have a greater retention need to compensate their executives at a higher post-performance level than their weaker industry performing counterparts. Since homogeneity does not appear to be a significant factor for filtering industry returns in the compensation payout, then the clearer signal generated in a more homogeneous industry is less central to the analysis than the retention aspect of homogeneity.

Alternatively, in a sample of S&P 500 firms where the firms are sub-categorized into firms that have previously committed to industry-related RPE and those who have

not committed to any form of RPE, the pre-committal sample produced results that are essentially the same as with the larger S&P 1500 sample. The sample also suggests that pre-committal firms are serious in their commitment to RPE. However, the non-committal sample displayed an RPE-like payout (for changes in compensation levels only) that is greater for more homogeneous firms. This result is not a function of whether the firm is in the top or bottom percentile of firms in their industries. The evidence suggests that while replacements costs appear to be important to the degree that RPE is implemented, the clarity of the RPE signal that a firm receives is also important. This supports Murphy's (1999) conclusions.

There is also evidence suggesting that the pay-performance relationship may break down in weaker performing firms (suggested by both samples). This seems to conform with prior results by Brenner, Sundram, and Yermack (2000) and Chance, Kumar, and Todd 2000) that find that the value granted to executives when repricing options does not substitute for yearly compensation. While the empirical study did not include involuntary turnover issues, future research may offer insight into the compensation practices of poorly performing firms. Previous research has shown that the threat of firing and pay-performance sensitivity are substitutes in the presence of career concerns (see Hartzell 1998). Future empirical work concerning pay-performance sensitivity and the involuntary turnover relation may offer greater insight concerning the overall principal-agent relationship. Future research may also help describe the effect of corporate governance crises on the pay-performance relationships of firms.

Chapter 6: Conclusions

RPE has recently received a great deal of attention in the literature. Most of the focus has been on the advantages of insuring executives from industry trends that are beyond their control or the impact of the competitive environment on the implementation of RPE. The literature has not examined costs that firms may incur to replace lost executives and the impact of these costs on the willingness to implement RPE. This dissertation investigates how executive replacements costs affect RPE implementation. The evidence reveals that the degree to which RPE is utilized is related to the ability of firms to gather accurate information on their relative performance and the costs of replacing departed executives.

A model of RPE is presented that considers both replacement costs to the firm and costs that executives incur when they voluntarily leave a firm. It predicts that the power of the incentives a firm can offer to its executives are non-increasing in the costs that an executive will incur to switch firms. It also suggests that a firm's ability to introduce high powered incentives is reduced if the costs of replacing an executive are great. Consequently, firms with higher retention costs will find it difficult to use RPE, which qualifies as a high powered incentive.

The predictions of the model are tested by empirically estimating the likelihood that a firm will pre-commit to RPE at the beginning of a performance period. The evidence indicates that, overall, firms competing in more homogeneous industries are more likely to commit to RPE contracts. However, higher performing firms in more homogeneous industries are less likely to commit to RPE than poorly performing firms in similar industries. Because homogeneity is a proxy for both replacement costs and the

clarity of an RPE signal, the results suggest that both of these factors influence the likelihood that a firm will commit to RPE.

The empirical analysis also examines differences in the actual compensation paid by firms that pre-commit to RPE and firms that do not to pre-commit to RPE. Although somewhat mixed, the results are generally consistent with the evidence on which firms commit to RPE. For a sample of S&P 1,500 firms over the 1993 to 2000 period, industry homogeneity is found to have either no-effect, or at best, a very weak detrimental effect on the RPE pay-performance relation. The evidence is similar for a sample of S&P 500 firms that pre-committed to RPE in 2000, for their 2001 performance year compensation. In both cases, contemporaneous industry-performance is significantly negatively related to the degree to which observed compensation payouts are consistent with RPE. However, evidence for firms in the S&P 500 sample that did not pre-commit to an RPE mechanism indicates that the observed level of RPE suggested by changes in compensation is positively related to the homogeneity for the industry in which the firm competes. In contrast, industry performance is not a significant predictor of compensation in this sample. Overall, the results suggest that replacement costs, as well as the availability of a clear RPE signal, are important predictors of the use of RPE. The analysis also suggests that compensation at weaker firms tends to include guaranteed minimum compensation thresholds.

The evidence in this dissertation suggests that replacement costs affect the decision to either its pre-commitment to RPE or to pay executives in a manner consistent with RPE. Although the decision to pre-commitment to RPE is different from the decision to actually pay based on RPE once firm performance is observed, both decisions appear to be affected by the cost of replacing a departing executive.

There are three broad implications of the evidence from this study. First, RPE implementation is influenced by the replacement costs that a firm must incur when replacing a departed executive and the precision of the signal regarding the relative performance of the firm. The importance of the precision of performance signal supports Murphy's (1999) conclusions. It also suggests that replacement costs and the clarity of a RPE signal should be considered when analyzing RPE and that empirical work may be subject to errors if they are not incorporated when testing for RPE. This may also be contributing to the apparent lack of RPE documented by Antle and Smith (1986), Ely (1991), and Gibbons and Murphy (1990). For example, Aggarwal and Samwick (1999a) find that the results of compensation regressions may be altered if stock return volatility is omitted from the analysis.

A second implication of the evidence supports Murphy's (1999) suggestion that the explicit RPE choices may be different from the implicit RPE choices. The preliminary evidence in this study suggests that the decision to pre-commit to RPE is related more strongly to the precision of an RPE signal than the actual post-performance payout.

Last, the evidence indicates that compensation at poorly performing firms tends to be partially disconnected from actual industry-performance. Managers at top and bottom -performing firms in an industry appear to be paid according to different formulae. This suggests that further study of the pay-performance relation for poorly performing executives may be a fruitful avenue for future research.

Limitations of a single-period study such as this should also be noted. The empirical tests that examine pre-commitment to RPE rely on a public decision at a point in time. The evidence is incomplete on how pre-commitment to RPE changes as industry performance rankings evolve over time. Likewise, the evidence in this study does not

indicate how firms that have not yet pre-committed to RPE may choose to pre-commit in later periods.

The assumption that firm-industry choice is exogenous, as well as the assumption that firm performance may serve as a proxy for replacement costs, should also be noted. To the extent that these are empirical issues, further research is warranted. Finally, the results indicate that the importance of replacement costs and signal precision can change with significant macroeconomic regime changes, such as during a corporate governance crisis. Further work concerning the effect on these changes would likely significantly contribute to our understanding executive compensation.

Table I: General Summary Statistics for Year 2000 Sample Proxy Companies

This table reports summary statistics for the 2000 sample year of 403 firms. Data is from the Standard and Poor's ExecuComp S&P500 dataset. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Revenues for the firm are denominated in millions of dollars. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Industry percentile returns reflect a firm's percentile return compared to all the firm's in that firm's 2-digit SIC code defined industry. Research & development as percent of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of Property and plant as a percentage of the book value of the firm.

	Mean	Median	Minimum	Maximum
Market value (millions)	25,500	8,639	473	475,000
Market value to book value	2.06	1.00	0.03	14.24
Revenues (millions)	11,457	5,207	271	181,803
Research and development as a percent of revenues	3.49%	0.00%	0.00%	95.70%
Dividend yield percentage	1.59%	1.12%	0.00%	12.07%
Property and plant as percent of book value	29.27%	25.78%	0.00%	91.77%
One-year 2-digit industry return percentile	0.6197	0.6364	0.0546	1.0000
Two-year 2-digit industry return percentile	0.6054	0.6316	0.0313	1.0000
Number of 2-digit SIC code peers	301	174	16	1,014
Monthly stock return standard deviation measured over the prior 60 months	11.01%	10.02%	4.82%	30.61%
Homogeneity percentile for firm 2-digit SIC code	0.4817	0.4871	0.0000	1.0000
Number of board meetings	8.12	8	1	29

Table II: Relative Performance Compensation Frequency Table

This table reports the frequency of the categories of relative performance mechanisms for the 2000 sample year of 403 firms. Data is from the Standard and Poor's 500 firm proxy statements. Industry Relative Compensation Measures refers to relative performance compensation measures which only include an industry benchmark that is market determined. Accounting Relative Compensation Measures refers to relative performance compensation measures based upon an external accounting derived benchmark. Broad Market Relative Measures refer to relative performance compensation which only include a broad market measure which is externally determined. All Relative Compensation Measures refers to any relative performance compensation measure which includes all accounting and market measures.

	Frequency	Percent of total
Industry (Financial Market) Relative Compensation Measures		
All comp choices	94	0.233
Bonus only	23	0.057
All long-term compensation	79	0.196
All long-term compensation except options	76	0.189
Long-term cash related plans only	57	0.141
Accounting Relative Compensation Measures		
All comp choices	65	0.161
Bonus only	40	0.099
All long-term compensation	32	0.079
All long-term compensation except options	29	0.072
Long-term cash related plans only	21	0.052
Broad Market (Financial Market) Relative Compensation Measures		
All comp choices	27	0.067
Bonus only	5	0.012
All long-term compensation	23	0.057
All long-term compensation except options	23	0.057
Long-term cash related plans only	19	0.047
All Relative Compensation Measures		
All comp choices	134	0.333
Bonus only	53	0.132
All long-term compensation	99	0.246
All long-term compensation except options	93	0.231
Long-term cash related plans only	69	0.171

Table III: Variable Correlations with Industry Homogeneity Percentile

This table reports the correlation coefficient for control variables with industry homogeneity percentile summary for the 2000 sample year firms. Data is from the Standard and Poor's ExecuComp S&P500 dataset. Variables are listed in the order that they appear in the probit model. Industry homogeneity measure is the percentile value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Industry Relative Compensation Measures refers to relative performance compensation measures which only include an industry benchmark that is market determined. Accounting Relative Compensation Measures refers to relative performance measures based upon an external accounting derived benchmark. Broad Market Relative Measures refer to relative performance compensation which only include a broad mareket measure which is externally determined. All Relative Compensation refers to any relative performance compensation measure which includes all accounting and market measures.

	Correlation with industry homogeneity percentile partitioned by definition of pre-commitment							
	Industry relative measure		Accounting relative measure		Broad market relative measure		All relative measures	
	Pre-commit	Not Pre-commit	Pre-commit	Not Pre-commit	Pre-commit	Not Pre-commit	Pre-commit	Not Pre-commit
Market value to book value	**(0.2412)****	**(0.2584)*****	**(0.4048)*****	**(0.2459)*****	(0.0796)	**(0.2973)*****	**(0.3037)*****	**(0.2313)*****
Revenues (millions)	**(0.3130)*****	**0.0993***	0.0390	(0.0041)	**(0.3822)****	0.0648	**(0.2265)*****	0.0934
One-year percentile returns	(0.1205)	0.0588	0.1251	(0.0159)	(0.2572)	0.0229	(0.0656)	0.0440
Two-year percentile returns	**(0.1752)***	0.0154	(0.0974)	(0.0512)	(0.3030)	(0.0435)	0.1387	0.0202
Number of board meetings	(0.0520)	0.0674	0.0450	0.0768	(0.1030)	0.0791	(0.0311)	0.0205
Research and development as a percent of revenues	**(0.3690)*****	**(0.2588)*****	**(0.6182)*****	**(0.2434)*****	**(0.5868)*****	**(0.2874)*****	**(0.4380)*****	**(0.2284)*****
Monthly stock return standard deviation measured over the prior 60 months	(0.0672)	**(0.1969)*****	**(0.2679)*****	**(0.1913)*****	(0.0796)	**(0.2973)*****	**(0.1447)*****	**(0.1764)*****
Dividend yield percentage	0.1521	0.0721	**0.2202***	**0.1237****	0.0513	**.1686*****	**0.1771****	0.0428)
Property and plant as percent of book value	**0.4447*****	**0.1876*****	**0.2613****	**0.2778*****	**0.4120****	**.2804*****	**0.3725*****	**0.1831*****

*** Denotes significance at the 99% confidence level.
** Denotes significance at the 95% confidence level.
* Denotes significance at the 90% confidence level.

Table IV: Correlation Table for Pre-Commitment/No Pre-Commitment to RPE Sample

This table reports the correlation coefficient between all variables utilized in the probit analysis for the 2000 sample year firms. Data is from the Standard and Poor's ExecuComp S&P500 dataset as well as from proxy statements. Industry relative compensation measures refers to relative performance compensation measures which only include an industry benchmark that is market determined. Accounting relative compensation measures refers to relative performance measures based upon an external accounting derived benchmark. Broad market relative measures refer to relative performance compensation which only include a broad mareket measure that is externally determined. All Relative Compensation refers to any relative performance compensation measure that includes all accounting and market measures. One (two) year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Industry percentile returns reflect a firm's percentile return compared to all the firm's in that firm's 2-digit SIC code defined industry. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Research & development as percent of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common . Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of Property and plant as a percentage of the book value of the firm.stockoutstanding to the book value of the commons stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of Property and plant as a percentage of the book value of the firm.

	Pre-commitment to industry RPE	Pre-commitment to accounting RPE	Pre-commitment to broad market RPE	Pre-commitment to any RPE	One-year percentile returns	Two-year percentile returns	Homo-geneity percentile	Revenue	Research and Devel-opment as a percent of revenue	Number of board meetings	Market to book value	Common stock return standard deviation	Dividend yield percent-age	Property and plant plant as a percent book value
Pre-commitment to industry RPE	**1.0000**													
Pre-commitment to accounting RPE	**0.2048**	**1.0000**												
Pre-commitment to broad market RF	**0.4154**	**0.0984**	**1.0000**											
Pre-commitment to any RPE	**0.7815**	**0.6213**	**0.3797**	**1.0000**										
One-year percentile returns	(0.0501)	(0.0013)	0.0131	(0.0170)	**1.0000**									
Two-year percentile returns	**(0.1370)**	(0.0207)	(0.0426)	**(0.1189)**	**0.6091**	**1.0000**								
Homogeneity percentile for firm 2-digit SIC code	**0.2091**	**0.1554**	(0.0491)	**0.2318**	0.0027	(0.0601)	**1.0000**							
Revenue	0.0605	0.0093	**0.1181**	0.0573	(0.0744)	(0.0541)	0.0011	**1.0000**						
Research and development as a percent of revenues	**(0.0982)**	**(0.0233)**	(0.0653)	(0.0854)	(0.0130)	**0.1530**	**(0.2835)**	**(0.1008)**	**1.0000**					
Number of board meetings	**0.1257**	(0.0352)	0.1041	0.0851	(0.1001)	**(0.1414)**	0.0621	0.0884	**0.1264**	**1.0000**				
Market value to book value	**(0.1885)**	(0.0725)	**(0.1275)**	**(0.1742)**	**0.1834**	**0.3410**	**(0.2768)**	**(0.1036)**	**0.4450**	**(0.1167)**	**1.0000**			
Monthly stock return standard deviation measured over the prior 60 montl	**(0.2396)**	**(0.0870)**	**(0.1018)**	**(0.2447)**	(0.0396)	**0.1522**	**(0.2120)**	**(0.1809)**	**0.4575**	(0.0361)	**0.3153**	**1.0000**		
Dividend yield percentage	**0.2791**	**0.0831**	**0.1438**	**0.2570**	**(0.2227)**	**(0.4225)**	**0.1478**	0.0650	**(0.2625)**	**0.1523**	**(0.3895)**	**(0.4958)**	**1.0000**	
Property and plant as percent of book value	**0.1966**	**0.1139**	0.0251	**0.1912**	**(0.1265)**	**(0.1512)**	**0.2871**	0.0234	**(0.2433)**	0.0140	**(0.1956)**	**(0.2389)**	**0.1847**	**1.0000**

Bold values denotes significance at the 95% confidence level or better.

Table V: Percentile Return Mean Standard Deviations Partitioned by Pre-Commitment or No Pre-Commitment

This table reports the mean return standard deviations of stock returns over the preceding 60 months. The samples are partitioned by firms that have pre-commited or not pre-committed to a relative performance mechanism for the 2000 sample year firms. Co

	Sixty-month return standard deviation means			
	Industry relative measure	Accounting relative measure	Market relative measure	All Relative relative measure
Pre-commitment	0.1153	0.1116	0.1111	0.1169
No pre-commitment	0.0941	0.1028	0.0957	0.0974
Difference	0.0212***	0.0088***	0.0155***	0.0195***

*** Denotes a significant difference in means at the 99% level.

Table VI: Pre-Commitment Frequency and Mean Homogeneity Factors

This table reports the frequency of pre-commiting to a relative performance mechanism as well as the correlation coefficient for regression variables with industry homogeneity measures summary for the 2000 sample year firms. Confirmation of a pre-commitment is obtained from a firm's SEC files proxy statements. Data is from the Standard and Poor's ExecuComp S&P500 dataset. The industry homogeneity measure is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Industry relative compensation measures refers to relative performance compensation measures which only include an industry benchmark that is market determined. Accounting relative compensation measures refers to relative performance compensation measures based upon an external accounting derived benchmark. Broad market relative measures refer to relative performance compensation which only include a broad market measure which is externally determined. All relative compensation measures refers to any relative performance compensation measure which includes all accounting and market measures.

Panel A: Pre-commitment frequency

	Number of companies	Pre-commit to RPE/Not pre-commit to RPE ratio				Number of 2-digit SIC codes
		Industry relative measure	Accounting relative measure	Market relative measure	All relative relative measure	
Manufacturing	207	47/160	39/168	18/189	72/135	16
Non-manufacturing	196	47/149	26/170	9/187	62/134	22
Total	403	94/309	65/338	27/376	134/269	38

Panel B: Mean homogeneity levels

	Mean homogeneity factor partitioned by pre-commitment or no pre-commitment			
	Industry relative measure	Accounting relative measure	Market relative measure	All relative relative measure
Pre-commitment	0.5960	0.5885	0.4263	0.5807
No pre-commitment	0.4469	0.4611	0.4856	0.4323
Difference	**0.1491*** **	**0.1274*** **	(0.0593)	**0.1484*** **

*** Denotes a significant difference in means at the 99% level.

Table VII: Percentile Returns Partitioned by Pre-Commitment/ No Pre-Commitment

This table reports the industry percentile return of firms that have pre-commited to a relative performance mechanism for the 2000 sample year firms. Confirmation of a pre-commitment is obtained from a firm's SEC files proxy statements. Industry relative compensation measures refers to relative performance compensation measures which only include an industry benchmark that is market determined. Accounting relative compensation measures refers to relative performance compensation measures based upon an external accounting derived benchmark. Broad market relative measures refer to relative performance compensation which only include a broad market measure which is externally determined. All relative compensation measures refers to any relative performance compensation measure which includes all accounting and market measures.

	One-year percentile returns with respect to a firm's industry			
	Industry relative measure	Accounting relative measure	Market relative measure	All relative relative measure
Pre-commitment	0.5995	0.6191	0.6307	0.6144
No pre-commitment	0.6260	0.6199	0.6189	0.6225
Difference	(0.0265)	(0.0008)	0.0117	(0.0081)
	Two-year percentile returns with respect to a firm's industry			
	Industry relative measure	Accounting relative measure	Market relative measure	All Relative relative measure
Pre-Commitment	0.5472	0.6075	0.5675	0.5660
No Pre-Commitment	0.6234	0.5943	0.6080	0.6255
Difference	**(0.0762)*** **	0.0132	(0.0405)	**(0.0594)*** **

*** Denotes a significant difference in the means at the 99% level.

Table VIII: Panel A : (1 year percentile version) Probit Model of the Likelihood of Pre-Committing to Industry Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and equal to zero if no committment has occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. One year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percent of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock,measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of Property and plant as a percentage of the book value of the firm. Industry relatives measures are those that explicitly compensate the executive team, through vesting measures or grant calculations, by calculating the firm's market return compared to that of an industry return. All comp refers to all measures of compensation, Bonus refers only to bonus compensation, All LT comp refers only to all Long-term compensation, LT comp without options refers to only the long-term compensation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return	0.2946976	0.08653	0.2424439	0.2464569	0.1893647
	(0.1650)	(0.4040)	(0.2070)	(0.2000)	(0.2020)
Homogeneity percentile for 2-digit SIC code: F(M	**0.456624**	**0.1473212**	**0.367474**	**0.3627895**	0.2004919
	(0.0230)	(0.0620)	(0.0400)	(0.0410)	(0.1310)
One-year industry percentile return X homogeneity percentile	-0.4880829	-0.1398542	-0.4403413	-0.4255872	-0.307478
	(0.1280)	(0.2980)	(0.1230)	(0.1310)	(0.1500)
Revenues (billions)	-0.0000456	-0.0005645	0.0002866	0.0002564	0.0006793
	(0.9680)	(0.2640)	(0.7600)	(0.7800)	(0.2860)
Research and development as a percent of revenues	**0.0116253**	0.0002985	**0.0116172**	0.0067044	**0.0073943**
	(0.0280)	(0.8660)	(0.0170)	(0.1590)	(0.0460)
Number of board meetings	**0.012156**	0.0000971	**0.0120992**	**0.0096691**	0.0054439
	(0.0730)	(0.9760)	(0.0360)	(0.0820)	(0.1990)
Market / book value	**-0.0363**	-0.00968	**-0.0321**	**-0.0256**	**-0.0275**
	(0.0220)	(0.1200)	(0.0340)	(0.0860)	(0.0790)
Standard deviation	**-2.766393**	0.1533694	**-3.213203**	**-2.980919**	**-2.408322**
	(0.0300)	(0.6040)	(0.0010)	(0.0020)	(0.0000)
Dividend yield	0.0125166	-0.0027535	0.0153665	0.0185946	**0.0163555**
	(0.4180)	(0.6360)	(0.2590)	(0.1570)	(0.0970)
Property & plant as a percentage of book value	0.0016609	**0.00086**	0.0002677	0.0002385	0.0001687
	(0.1090)	(0.0530)	(0.7590)	(0.7760)	(0.7980)
Sample size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0000	0.0411	0.0000	0.0000	0.0000

Table VIII: Panel B : (1 year percentile version) Probit Model of the Likelihood of Pre-Committing to Accounting Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and equal to zero if no committment has occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. One year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percent of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock,measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of Property and plant as a percentage of the book value of the firm. Accounting relative measures include any relative measure that will depend upon a comparison that can be calculated through external financial statement performance measures. All comp refers to all measures of compensation, Bonus refers only to bonus compensation, All LT comp refers only to all Long-term compensation, LT comp without options refers to only the long-term compensation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return	-0.1210146	-0.0816972	-0.1794257	-0.1714984	-0.0611823
	(0.5030)	(0.5820)	(0.1680)	(0.1770)	(0.5150)
Homogeneity percentile for 2-digit SIC code: F(M	0.0053479	0.0534484	-0.1383289	-0.1267239	-0.057374
	(0.9730)	(0.6630)	(0.1990)	(0.2140)	(0.4560)
One-year industry percentile return X homogeneity percentile	0.2935945	0.1521798	**0.3218533**	**0.3118267**	0.1572082
	(0.2620)	(0.4480)	(0.0810)	(0.0790)	(0.2380)
Revenues (billions)	-0.0001554	-0.0002519	-0.0000774	0.0000817	0.0001257
	(0.8350)	(0.6520)	(0.8540)	(0.8200)	(0.5700)
Research and development as a percent of revenues	**0.0100364**	**0.0047883**	**0.0046873**	**0.004384**	**0.0043368**
	(0.0100)	(0.0810)	(0.0400)	(0.0400)	(0.0020)
Number of board meetings	-0.0067558	-0.0050627	-0.0021264	-0.0006161	-0.0017191
	(0.2850)	(0.3250)	(0.5640)	(0.8450)	(0.4400)
Market / book value	-0.00942	0.000926	-0.0164	-0.0149	-0.00968
	(0.4010)	(0.9070)	(0.1660)	(0.2100)	(0.2700)
Standard deviation	-0.9028092	-0.1645009	**-0.9242692**	-0.8541559	**-0.7609322**
	(0.1660)	(0.7270)	(0.0950)	(0.1140)	(0.0180)
Dividend yield	0.0075321	0.0041558	0.0001334	0.0018191	0.0053353
	(0.5630)	(0.6560)	(0.9880)	(0.8200)	(0.3550)
Property & plant as a percentage of book value	0.0010683	0.00004936	0.0001039	-0.002702	-0.0000834
	(0.2480)	(0.4880)	(0.8580)	(0.5950)	(0.8350)
Sample size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0158	0.1540	0.1090	0.0690	0.0037

Table VIII: Panel C : (1 year percentile version) Probit Model of the Likelihood of Pre-Committing to Broad Market Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and equal to zero if no committment has occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. One year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. Broad market relative measures are those that explicitly compensate the executive team through vesting measures or grant caluclations by calculating the firm's market return and comparin it to that of a broad market return. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return	**0.1089978**	0.00564	0.0679019	0.0679019	0.0304854
	(0.0760)	(0.3100)	(0.1130)	(0.1130)	(0.2700)
Homogeneity percentile for 2-digit SIC code: F(M	0.0557683	0.0031771	0.0336817	0.0336817	0.0273086
	(0.2900)	(0.4690)	(0.3540)	(0.3540)	(0.2170)
One-year industry percentile return X homogeneity percentile	**-0.1660877**	-0.0059975	**-0.1158833**	**-0.1158833**	**-0.0882616**
	(0.0550)	(0.3250)	(0.0560)	(0.0560)	(0.0140)
Revenues (billions)	0.0002838	-0.0000124	0.0002346	0.0002346	0.0000937
	(0.2710)	(0.3650)	(0.1750)	(0.1750)	(0.4150)
Research and development as a percent of revenues	0.000313	-0.0000796	0.0004927	0.0004927	0.0006532
	(0.8650)	(0.2720)	(0.7190)	(0.7190)	(0.4870)
Number of board meetings	0.0027999	**0.0005459**	0.0008864	0.0008864	0.0005248
	(0.1280)	(0.0840)	(0.4630)	(0.4630)	(0.4850)
Market / book value	**-0.0264**	0.000274	**-0.0229**	**-0.0229**	**-0.0138**
	(0.0280)	(0.2860)	(0.0180)	(0.0180)	(0.0390)
Standard deviation	-0.5099711	**-0.0434767**	-0.304708	-0.304708	**-0.3949782**
	(0.1880)	(0.0880)	(0.2630)	(0.2630)	(0.0200)
Dividend yield	-0.0045479	0.0001985	**-0.0044633**	**-0.0044633**	**-0.0030601**
	(0.2430)	(0.6580)	(0.0770)	(0.0770)	(0.0590)
Property & plant as a percentage of book value	0.0002006	**0.00011**	-0.0000477	-0.0000477	-0.0001515
	(0.5270)	(0.0060)	(0.8420)	(0.8420)	(0.3900)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.2308	0.0000	0.1420	0.1420	0.0012

Table VIII: Panel D : (1 year percentile version) Probit Model of the Likelihood of Pre-Committing to All Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and equal to zero if no committment has occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. One year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. All relative measures include any relative measures, accounting or market related where compensation will depend upon a comparison to some external performance measure. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return	0.2815817	0.0174547	0.1429054	0.1536086	0.1536794
	(0.2450)	(0.9240)	(0.4950)	(0.4590)	(0.3480)
Homogeneity percentile for 2-digit SIC code: F(M	**0.4742923**	0.1993928	0.2486039	0.2554561	0.1721129
	(0.0480)	(0.2020)	(0.2080)	(0.1860)	(0.2390)
One-year industry percentile return X homogeneity percentile	-0.3538945	-0.0105677	-0.2532538	-0.2401096	-0.21286
	(0.3460)	(0.9670)	(0.4210)	(0.4360)	(0.3690)
Revenues (billions)	0.0000452	-0.0006801	0.0002493	0.003455	0.0008455
	(0.9740)	(0.3260)	(0.8160)	(0.7340)	(0.2530)
Research and development as a percent of revenues	**0.0177126**	0.0037306	**0.0144145**	**0.0087155**	**0.0093895**
	(0.0040)	(0.2470)	(0.0080)	(0.0970)	(0.0220)
Number of board meetings	0.0096758	-0.00183	**0.0118019**	0.0102764	0.0034224
	(0.2420)	(0.7540)	(0.0800)	(0.1050)	(0.4810)
Market / book value	**-0.0308**	-0.000703	**-0.0463**	**-0.0382**	**-0.0374**
	(0.0450)	(0.9390)	(0.0090)	(0.0340)	(0.0440)
Standard deviation	**-3.362892**	-0.2573038	**-3.868305**	**-3.566698**	**-2.873188**
	(0.0010)	(0.6300)	0.0000	(0.0010)	0.0000
Dividend yield	0.0186463	-0.0029548	0.0187852	0.0241845	**0.020555**
	(0.3200)	(0.7910)	(0.2280)	(0.1020)	(0.0680)
Property & plant as a percentage of book value	0.0018409	0.000948	0.0009147	0.000399	0.0002327
	(0.1390)	(0.2370)	(0.3630)	(0.6720)	(0.7240)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0000	0.0498	0.0000	0.0000	0.0000

Table IX: Panel A: (1 year percentile version) Probit Model with a Dummy Variable for the Top 50% of the Industry for the Likelihood of Pre-Committing to Industry Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and zero if no committment occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Top 50% dummy is a dummy variable whose value is 1 if the firm's 1-year return ranked in the top 50% of firms in its industry. One- year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. Industry relative measures are those that explicitly compensate the executive team, through vesting measures or grant calculations, by calculating the firm's market return compared to that of an industry return. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return X top 50% dummy	-0.0371677 (0.8740)	-0.04379 (0.6880)	-0.014044 (0.9460)	0.0189004 (0.9260)	-0.0122838 (0.9400)
Top 50% dummy	0.1241 (0.3740)	0.0706 (0.1840)	0.0836 (0.4940)	0.0612 (0.6160)	0.0522 (0.5910)
Homogeneity percentile for firm 2-digit SIC code F(M)	**0.2627087** (0.0280)	**0.1094016** (0.0320)	**0.1847917** (0.0820)	**0.185213** (0.0750)	0.0523733 (0.4830)
One-year industry percentile return X homogeneity percentile X top 50% dummy	-0.2031882 (0.3220)	-0.0910326 (0.3250)	-0.1692062 (0.3500)	-0.163173 (0.3580)	-0.0811282 (0.5370)
Revenues (billions)	0.0000616 (0.9570)	-0.0004865 (0.3230)	0.0003714 (0.6960)	0.0003323 (0.7200)	0.0007548 (0.2390)
Research and development as a percent of revenues	**0.0112396** (0.0330)	0.0001079 (0.9480)	**0.0113549** (0.0200)	0.0063879 (0.1890)	**0.0070998** (0.0620)
Number of board meetings	**0.0133187** (0.0500)	0.000756 (0.8010)	**0.0131028** (0.0250)	**0.0104864** (0.0630)	0.0061916 (0.1520)
Market / book value	**-0.036** (0.0220)	-0.00894 (0.1260)	**-0.0317** (0.0350)	**-0.0251** (0.0910)	**-0.0272** (0.0800)
Standard deviation	**-2.714384** (0.0030)	0.1684488 (0.5240)	**-3.156595** (0.0010)	**-2.936165** (0.0020)	**-2.389128** 0.0000
Dividend yield	0.0117244 (0.4410)	-0.0030923 (0.5660)	0.0153396 (0.2540)	0.0185718 (0.1510)	**0.0158708** (0.0970)
Property & plant as a percentage of book value	0.0016254 (0.1140)	**0.00084** (0.0420)	0.0002541 (0.7680)	0.0002306 (0.7820)	0.0001613 (0.8050)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0000	0.0254	0.0000	0.0000	0.0000

Table IX: Panel B: (1 year percentile version) Probit Model with a Dummy Variable for the Top 50% of the Industry for the Likelihood of Pre-Committing to Accounting Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and zero if no committment occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Top 50% dummy is a dummy variable whose value is 1 if the firm's 1-year return ranked in the top 50% of firms in its industry. One- year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. Accounting relative measures include any relative measure that will depend upon a comparison that can be calculated through external financial statement performance measures. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return X top 50% dummy	-0.2538597 (0.1930)	-0.1991594 (0.1810)	-0.1118932 (0.3950)	-0.0927029 (0.4500)	-0.0139159 (0.8750)
Top 50% dummy	0.1713 (0.1150)	0.1254 (0.1030)	0.0413 (0.6020)	0.0243 (0.7450)	(0.0045) (0.9390)
Homogeneity percentile for firm 2-digit SIC code F(M)	**0.1624684** (0.0880)	**0.1312221** (0.0730)	-0.0027853 (0.9640)	-0.005632 (0.9230)	-0.0033164 (0.9310)
One-year industry percentile return X homogeneity percentile X top 50% dummy	0.0521227 (0.7530)	0.0299487 (0.8140)	0.1161058 (0.2840)	0.1312857 (0.2030)	0.0788674 (0.2580)
Revenues (billions)	-0.0001164 (0.8770)	-0.0002172 (0.6990)	-0.0000679 (0.8760)	0.0000939 (0.8020)	0.0001522 (0.4970)
Research and development as a percent of revenues	**0.0094209** (0.0180)	0.0042464 (0.1160)	**0.0047537** (0.0490)	**0.0045016** (0.0460)	**0.0044224** (0.0020)
Number of board meetings	-0.0056926 (0.3480)	-0.0041394 (0.3940)	-0.0019599 (0.5860)	-0.0005383 (0.8630)	-0.0018689 (0.3990)
Market / book value	-0.00976 (0.3940)	-0.000921 (0.9080)	-0.0176 (0.1460)	-0.0161 (0.1870)	-0.0101 (0.2550)
Standard deviation	-0.9381487 (0.1390)	-0.1714325 (0.7050)	**-0.9330597** (0.0920)	-0.8597478 (0.1160)	**-0.7493065** (0.0200)
Dividend yield	0.0046798 (0.7170)	0.0023387 (0.7940)	-0.0002118 (0.9810)	0.0017424 (0.8320)	0.0056836 (0.3100)
Property & plant as a percentage of book value	0.0009418 (0.3000)	0.0004367 (0.5270)	0.0001079 (0.8510)	-0.0002518 (0.6170)	-0.0000695 (0.8560)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0169	0.1896	0.1613	0.0825	0.0015

Table IX: Panel C: (1 year percentile version) Probit Model with a Dummy Variable for the Top 50% of the Industry for the Likelihood of Pre-Committing to Broad Market Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and zero if no committment occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Top 50% dummy is a dummy variable whose value is 1 if the firm's 1-year return ranked in the top 50% of firms in its industry. One- year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. Broad market relative measures are those that explicitly compensate the executive team through vesting measures or grant caluclations by calculating the firm's market return and comparin it to that of a broad market return. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return X top 50% dummy	0.0747774 (0.3430)	0.00919 0.1080	0.0323859 (0.5580)	0.0323859 (0.5580)	-0.0003993 (0.9920)
Top 50% dummy	(0.0348) (0.5970)	(0.0556) (0.1840)	(0.0093) (0.8250)	(0.0093) (0.8250)	0.0053 (0.8400)
Homogeneity percentile for firm 2-digit SIC code F(M)	-0.0127365 (0.6790)	0.000825 (0.5430)	-0.019431 (0.3520)	-0.019431 (0.3520)	-0.0103817 (0.4570)
One-year industry percentile return X homogeneity percentile X top 50% dummy	-0.0688536 (0.2040)	-0.0032492 (0.1320)	-0.0394412 (0.2990)	-0.0394412 (0.2990)	-0.0344003 (0.1520)
Revenues (billions)	0.0002851 (0.2770)	-0.0000155 (0.1320)	0.0002484 (0.1710)	0.0002484 (0.1710)	0.0001001 (0.4140)
Research and development as a percent of revenues	0.0002037 (0.9140)	-0.0000222 (0.7340)	0.0004099 (0.7750)	0.0004099 (0.7750)	0.0006269 (0.5400)
Number of board meetings	0.002841 (0.1370)	**0.0003264** (0.0640)	0.0010761 (0.4020)	0.0010761 (0.4020)	0.0007856 (0.3510)
Market / book value	**-0.0265** (0.0260)	0.000111 (0.4440)	**-0.0232** (0.0170)	**-0.0232** (0.0170)	**0.0143** (0.0390)
Standard deviation	-0.5341476 (0.1660)	**-0.0326077** (0.0530)	-0.3266694 (0.2370)	-0.3266694 (0.2370)	**-0.42398** (0.0190)
Dividend yield	-0.005172 (0.1850)	0.0001315 (0.6170)	**-0.0049248** (0.0650)	**-0.0049248** (0.0650)	**-0.0033603** (0.0630)
Property & plant as a percentage of book value	0.0001806 (0.5800)	**0.00007** (0.0010)	-0.0000564 (0.8230)	-0.0000564 (0.8230)	-0.0001698 (0.3700)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.2925	0	0.2360	0.2360	0.0042

Table IX: Panel D: (1 year percentile version) Probit Model with a Dummy Variable for the Top 50% of the Industry for the Likelihood of Pre-Committing to All Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and zero if no committment occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Top 50% dummy is a dummy variable whose value is 1 if the firm's 1-year return ranked in the top 50% of firms in its industry. One- year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. elative measures include any relative measures, accounting or market related where compensation will depend upon a comparison to some external performance measure. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return X top 50% dummy	-0.1350818 (0.6140)	-0.1324196 (0.4620)	-0.0970618 (0.6740)	-0.0299834 (0.8930)	-0.0182066 (0.9200)
Top 50% dummy	0.2506 (0.1210)	0.1344 (0.1690)	0.1492 (0.2730)	0.1000 (0.4550)	0.0541 (0.6230)
Homogeneity percentile for firm 2-digit SIC code F(M)	**0.3778833** (0.0090)	**0.2215137** (0.0170)	0.1648346 (0.1640)	0.1646915 (0.1520)	0.0606829 (0.4630)
One-year industry percentile return X homogeneity percentile X top 50% dummy	-0.2261204 (0.3450)	-0.0566 (0.7180)	-0.1368503 (0.4930)	-0.1122155 (0.5620)	-0.0393991 (0.7850)
Revenues (billions)	0.00205 (0.8850)	-0.0005981 (0.3890)	0.0003568 (0.7420)	0.00004473 (0.6630)	0.0009298 (0.2080)
Research and development as a percent of revenues	**0.0171206** (0.0060)	0.0031652 (0.3190)	**0.0141888** (0.0090)	0.0084598 (0.1170)	**0.009123** (0.0290)
Number of board meetings	0.011403 (0.1650)	-0.0009358 (0.8690)	**0.0129954** (0.0550)	**0.0111935** (0.0800)	0.004104 (0.4070)
Market / book value	**-0.0306** (0.0510)	-0.000557 (0.9520)	**-0.0469** (0.0080)	**-0.0384** (0.0320)	**-0.0371** (0.0430)
Standard deviation	**-3.341075** 0.0000	-0.2338175 (0.6480)	**-3.798031** 0.0000	**-3.496379** 0.0010	**2.843052** 0.0000
Dividend yield	0.018021 (0.3340)	-0.0036777 (0.7320)	0.0194694 (0.2060)	**0.0250856** 0.0860	**0.0204073** (0.0630)
Property & plant as a percentage of book value	0.0017652 (0.1550)	0.0009361 (0.2310)	0.0009037 (0.3650)	0.0004228 (0.6510)	0.0002589 (0.7260)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0000	0.0475	0.0000	0.0000	0.0000

Table X: Panel A : (2 year percentile version) Probit Model of the Likelihood of Pre-Committing to Industry Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and equal to zero if no committment has occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Two year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percent of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock,measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of Property and plant as a percentage of the book value of the firm. Industry relatives measures are those that explicitly compensate the executive team, through vesting measures or grant calculations, by calculating the firm's market return compared to that of an industry return. All comp refers to all measures of compensation, Bonus refers only to bonus compensation, All LT comp refers only to all Long-term compensation, LT comp without options refers to only the long-term compensation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return	0.3022334	0.00038	**0.3291894**	**0.3258766**	0.1839555
	(0.1500)	(0.9960)	(0.0810)	(0.0740)	(0.1990)
Homogeneity percentile for 2-digit SIC code: F(M	**0.5094162**	0.099679	**0.4729067**	**0.4648643**	**0.2130318**
	(0.0070)	(0.1550)	(0.0060)	(0.0050)	(0.0810)
One-year industry percentile return X homogeneity percentile	**-0.6056324**	-0.0638059	**-0.6603044**	**-0.6386363**	**-0.3542778**
	(0.0520)	(0.5970)	(0.0170)	(0.0170)	(0.0840)
Revenues (billions)	-0.0000617	-0.0006125	0.0002698	0.0002352	0.0006957
	(0.9550)	(0.2800)	(0.7650)	(0.7890)	(0.2630)
Research and development as a percent of revenues	**0.01142**	0.000233	**0.011579**	0.0067137	**0.0072151**
	(0.0290)	(0.8940)	(0.0150)	(0.1490)	(0.0500)
Number of board meetings	**0.0118345**	-0.0001423	**0.0118306**	**0.0094606**	0.0055092
	(0.0890)	(0.9660)	(0.0440)	(0.0960)	(0.2030)
Market / book value	**-0.0377**	-0.00867	**-0.0342**	**-0.0277**	**-0.0282**
	(0.0180)	(0.1640)	(0.0230)	(0.0620)	(0.0730)
Standard deviation	**-2.900391**	0.1059513	**-3.40166**	**-3.164009**	**-2.458105**
	(0.0010)	(0.6830)	0.0000	0.0000	0.0000
Dividend yield	0.0077272	-0.0051385	0.0113551	0.0146573	0.014059
	(0.6370)	(0.3670)	(0.4370)	(0.2940)	(0.1760)
Property & plant as a percentage of book value	0.0016177	**0.00087**	0.000135	0.0001041	0.0000817
	(0.1250)	(0.0530)	(0.8800)	(0.9040)	(0.9040)
Sample size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0000	0.0194	0.0000	0.0000	0.0000

Table X: Panel B : (2 year percentile version) Probit Model of the Likelihood of Pre-Committing to Accounting Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and equal to zero if no committment has occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Two year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percent of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock,measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of Property and plant as a percentage of the book value of the firm. Accounting relative measures include any relative measure that will depend upon a comparison that can be calculated through external financial statement performance measures. All comp refers to all measures of compensation, Bonus refers only to bonus compensation, All LT comp refers only to all Long-term compensation, LT comp without options refers to only the long-term compensation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return	0.0869945	0.0226076	-0.0453707	-0.0877875	-0.0134317
	(0.6190)	(0.8760)	(0.7040)	(0.4380)	(0.8470)
Homogeneity percentile for 2-digit SIC code: F(M	0.2119678	0.1983708	-0.0170425	-0.0192072	-0.0270695
	(0.2000)	(0.1430)	(0.8770)	(0.8450)	(0.5960)
One-year industry percentile return X homogeneity percentile	-0.0540491	-0.0951309	0.1211153	0.1418727	0.1085148
	(0.8330)	(0.6520)	(0.4850)	(0.3810)	(0.2290)
Revenues (billions)	-0.0002288	-0.0003007	-0.0001071	0.0000418	0.0000966
	(0.7580)	(0.5930)	(0.7970)	(0.9070)	(0.6450)
Research and development as a percent of revenues	**0.0101454**	**0.0047224**	**0.0049258**	**0.0045518**	**0.0044895**
	(0.0110)	(0.0840)	(0.0470)	(0.0480)	(0.0030)
Number of board meetings	-0.0069189	-0.0056058	-0.0023442	-0.0009905	-0.0015734
	(0.2710)	(0.2740)	(0.5270)	(0.7500)	(0.4810)
Market / book value	-0.0121	-0.000182	-0.0183	-0.0164	-0.00972
	(0.2880)	(0.9820)	(0.1480)	(0.1890)	(0.2780)
Standard deviation	-0.9758174	-0.2323704	**-0.9036477**	**-0.8718348**	**-0.7895027**
	(0.1220)	(0.6050)	(0.0820)	(0.0810)	(0.0130)
Dividend yield	0.0080417	0.0013065	0.0015161	0.0011692	0.0074282
	(0.5650)	(0.8980)	(0.8710)	(0.8900)	(0.2130)
Property & plant as a percentage of book value	0.0010245	0.0004511	0.000141	-0.0002605	-0.0000595
	(0.2670)	(0.5340)	(0.8090)	(0.6090)	(0.8770)
Sample size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0207	0.1610	0.2347	0.1908	0.0080

Table X: Panel C : (2 year percentile version) Probit Model of the Likelihood of Pre-Committing to Broad Market Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and equal to zero if no committment has occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Two-year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. Broad market relative measures are those that explicitly compensate the executive team through vesting measures or grant caluclations by calculating the firm's market return and comparin it to that of a broad market return. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return	0.883059	**0.00687**	0.0498366	0.0498366	0.0132892
	(0.1110)	(0.0470)	(0.1840)	(0.1840)	(0.6730)
Homogeneity percentile for 2-digit SIC code: F(M	0.0485735	0.0032037	0.0236108	0.0236108	-0.0090835
	(0.3760)	(0.4870)	(0.5230)	(0.5230)	(0.7610)
One-year industry percentile return X homogeneity percentile	**-0.1678144**	-0.0061165	**-0.1060679**	**-0.1060679**	-0.0350467
	(0.0680)	(0.3870)	(0.0950)	(0.0950)	(0.4880)
Revenues (billions)	0.0002552	-0.00000876	0.0002078	0.0002078	0.0001181
	(0.2740)	(0.5400)	(0.1810)	(0.1810)	(0.3680)
Research and development as a percent of revenues	0.000269	-0.000064	0.000425	0.000425	0.0006655
	(0.8800)	(0.3450)	(0.7410)	(0.7410)	(0.5520)
Number of board meetings	0.0028616	**0.0005649**	0.0010662	0.0010662	0.0009151
	(0.1130)	(0.0690)	(0.3480)	(0.3480)	(0.3050)
Market / book value	**-0.0262**	0.000245	**-0.022**	**-0.022**	**-0.0154**
	(0.0290)	(0.3160)	(0.0200)	(0.0200)	(0.0500)
Standard deviation	**-0.5847225**	-0.0441721	**-0.3577386**	**-0.3577386**	**-0.4404946**
	(0.0660)	(0.1810)	(0.0990)	(0.0990)	(0.0290)
Dividend yield	-0.0006096	0.0002768	**-0.0053077**	**-0.0053077**	-0.0034708
	(0.1460)	(0.5520)	(0.0570)	(0.0570)	(0.1360)
Property & plant as a percentage of book value	0.0001511	**0.00011**	-0.0000709	-0.0000709	-0.0001458
	(0.6280)	(0.0070)	(0.7630)	(0.7630)	(0.4940)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.1253	0.0000	0.1746	0.1746	0.3523

Table X: Panel D : (2 year percentile version) Probit Model of the Likelihood of Pre-Committing to All Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and equal to zero if no committment has occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Two-year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. elative measures include any relative measures, accounting or market related where compensation will depend upon a comparison to some external performance measure. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return	0.3111882	-0.0440433	0.3115644	0.2591808	0.2072162
	(0.2000)	(0.7860)	(0.1410)	(0.1990)	(0.1950)
Homogeneity percentile for 2-digit SIC code: F(M	**0.5955825**	0.1978623	**0.4292853**	**0.415979**	**0.2422763**
	(0.0100)	(0.1800)	(0.0270)	(0.0240)	(0.0720)
One-year industry percentile return X homogeneity percentile	-0.5767352	-0.0044813	**-0.5876146**	**-0.5398856**	-0.3505209
	(0.1150)	(0.9850)	(0.0590)	(0.0700)	(0.1210)
Revenues (billions)	-0.0000236	-0.0007032	0.0002053	0.0002981	0.0008271
	(0.9860)	(0.3130)	(0.8450)	(0.7660)	(0.2570)
Research and development as a percent of revenues	**0.0175481**	0.003647	**0.0144752**	**0.0087229**	**0.0093412**
	(0.0050)	(0.2570)	(0.0070)	(0.0930)	(0.0220)
Number of board meetings	0.0091699	-0.0022109	**0.0114115**	0.0097698	0.0033856
	(0.2740)	(0.7060)	(0.0940)	(0.1260)	(0.4930)
Market / book value	**-0.0327**	0.000158	**-0.0488**	**-0.0404**	**-0.0384**
	(0.0330)	(0.9860)	(0.0060)	(0.0250)	(0.0410)
Standard deviation	**-3.582057**	-0.3033021	**-4.025353**	**-3.779802**	**-2.943157**
	0.0000	(0.5560)	0.0000	0.0000	0.0000
Dividend yield	0.0128603	-0.0061403	0.0165859	0.0193431	0.019109
	(0.5220)	(0.6050)	(0.3210)	(0.2200)	(0.1090)
Property & plant as a percentage of book value	0.0017274	0.000895	0.0008201	0.002467	0.0001791
	(0.1670)	(0.2670)	(0.4220)	(0.7960)	(0.8120)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0000	0.0511	0.0000	0.0000	0.0000

Table XI: Panel A: (2 year percentile version) Probit Model with a Dummy Variable for the Top 50% of the Industry for the Likelihood of Pre-Committing to Industry Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and zero if no committment occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Top 50% dummy is a dummy variable whose value is 1 if the firm's 1-year return ranked in the top 50% of firms in its industry. Two- year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. Industry relative measures are those that explicitly compensate the executive team, through vesting measures or grant calculations, by calculating the firm's market return compared to that of an industry return. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return X top 50% dummy	0.1373264 (0.5800)	-0.04804 (0.6230)	0.1813911 (0.4090)	0.1464993 (0.5000)	0.0474913 (0.7870)
Top 50% dummy	0.0906 (0.5610)	0.0395 (0.5020)	0.0655 (0.6340)	0.0801 (0.5500)	0.0614 (0.5650)
Homogeneity percentile for firm 2-digit SIC code F(M)	**0.3962383** (0.0010)	**0.0886202** (0.0550)	**0.3337238** (0.0020)	**0.3279174** (0.0020)	**0.1465033** (0.0450)
One-year industry percentile return X homogeneity percentile X top 50% dummy	**-0.4924685** 0.0140	-0.046568 (0.5760)	**-0.5095857** (0.0040)	**-0.4841894** (0.0050)	**-0.2917625** (0.0260)
Revenues (billions)	-0.0002414 (0.8470)	-0.0006078 (0.2710)	0.0001136 (0.9020)	0.000092 (0.9190)	0.0005947 (0.3570)
Research and development as a percent of revenues	**0.0111289** (0.0320)	0.0000538 (0.9760)	**0.0113901** (0.0160)	0.0064857 (0.1600)	**0.0068407** (0.0600)
Number of board meetings	**0.0126049** (0.0670)	0.0000941 (0.9770)	**0.0126925** (0.0280)	**0.01029** (0.0640)	0.0058385 (0.1610)
Market / book value	**-0.0372** (0.0200)	-0.00821 (0.1780)	**-0.0336** (0.0260)	**-0.0269** (0.0720)	**-0.0278** (0.0760)
Standard deviation	**-2.763925** (0.0020)	0.1614555 (0.5410)	**-3.259473** 0.0000	**-3.015166** (0.0010)	**-2.36746** 0.0000
Dividend yield	0.0081135 (0.6150)	-0.0045288 (0.4240)	0.0124543 (0.3840)	0.0151252 (0.2700)	0.011673 (0.2390)
Property & plant as a percentage of book value	0.0015334 (0.1480)	**0.00084** (0.0570)	0.0000367 (0.9670)	-0.0000124 (0.9880)	-0.0000399 (0.9530)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0000	0.0326	0.0000	0.0000	0.0000

Table XI: Panel B: (2 year percentile version) Probit Model with a Dummy Variable for the Top 50% of the Industry for the Likelihood of Pre-Committing to Accounting Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and zero if no committment occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Top 50% dummy is a dummy variable whose value is 1 if the firm's 1-year return ranked in the top 50% of firms in its industry. Two- year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. Accounting relative measures include any relative measure that will depend upon a comparison that can be calculated through external financial statement performance measures. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return X top 50% dummy	-0.249264 (0.2280)	-0.2217026 (0.1830)	-0.0924038 (0.4970)	-0.1367024 (0.2900)	-0.06113966 (0.4860)
Top 50% dummy	0.1693 (0.1510)	0.1364 (0.1340)	0.0332 (0.6780)	0.0441 (0.5300)	0.0154 (0.7530)
Homogeneity percentile for firm 2-digit SIC code F(M)	**0.1652145** (0.0990)	**0.1515648** (0.0670)	0.0014607 (0.9810)	0.0069249 (0.9000)	-0.0033064 (0.9190)
One-year industry percentile return X homogeneity percentile X top 50% dummy	0.0765643 (0.6480)	0.0137418 (0.9210)	0.1188786 (0.2590)	0.1314293 (0.1890)	0.0974969 (0.1550)
Revenues (billions)	-0.0002209 (0.7620)	-0.0003002 (0.5850)	-0.000083 (0.8420)	0.0000603 (0.8660)	0.0001133 (0.5980)
Research and development as a percent of revenues	**0.0096582** (0.0170)	0.0042889 (0.1260)	**0.0048339** (0.0500)	**0.0043577** (0.0570)	**0.0043104** (0.0040)
Number of board meetings	-0.0062885 (0.3090)	-0.0049267 (0.3280)	-0.0023439 (0.5180)	-0.0009381 (0.7570)	-0.0017241 (0.4320)
Market / book value	-0.0072 (0.4950)	0.00277 (0.7270)	-0.017 (0.1610)	-0.0151 (0.2010)	-0.00904 (0.2980)
Standard deviation	-0.813823 (0.2060)	-0.0663786 (0.8840)	-0.8867749 (0.1060)	-0.8290063 (0.1160)	**-0.7932167** (0.0140)
Dividend yield	0.0084768 (0.5280)	0.0028381 (0.7730)	0.0021973 (0.8020)	0.0020688 (0.7910)	0.0058378 (0.2850)
Property & plant as a percentage of book value	0.0008694 (0.3450)	0.0003374 (0.6360)	0.0001156 (0.8420)	-0.000295 (0.5520)	-0.0000925 (0.8040)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0234	0.1742	0.3129	0.2933	0.0075

Table XI: Panel C: (2 year percentile version) Probit Model with a Dummy Variable for the Top 50% of the Industry for the Likelihood of Pre-Committing to Broad Market Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and zero if no committment occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Top 50% dummy is a dummy variable whose value is 1 if the firm's 1-year return ranked in the top 50% of firms in its industry. Two- year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. Broad market relative measures are those that explicitly compensate the executive team through vesting measures or grant caluclations by calculating the firm's market return and comparin it to that of a broad market return. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return X top 50% dummy	-0.100579 (0.8950)	0.00002 (0.9950)	-0.0018187 (0.9730)	-0.0018187 (0.9730)	-0.02966 (0.5150)
Top 50% dummy	0.0505 (0.2190)	0.0048 (0.1950)	0.0267 (0.3680)	0.0267 (0.3680)	0.0278 (0.2540)
Homogeneity percentile for firm 2-digit SIC code F(M)	0.0070089 (0.8460)	**0.0028065** (0.0510)	-0.0025749 (0.9140)	-0.0025749 (0.9140)	-0.0140251 (0.4200)
One-year industry percentile return X homogeneity percentile X top 50% dummy	-0.0998033 (0.1120)	-0.0040031 (0.1320)	-0.0669639 (0.1240)	-0.0669639 (0.1240)	-0.0238439 (0.4610)
Revenues (billions)	-0.0002377 (0.3220)	-0.00000247 (0.6690)	0.0001989 (0.2180)	0.0001989 (0.2180)	0.0001011 (0.4300)
Research and development as a percent of revenues	0.0001892 (0.9200)	-0.0000377 (0.4770)	0.0004068 (0.7650)	0.0004068 (0.7650)	0.0006458 (0.5630)
Number of board meetings	**0.0030986** (0.0910)	**0.0003002** (0.0590)	0.0011508 (0.3260)	0.0011508 (0.3260)	0.0009181 (0.3030)
Market / book value	**-0.0252** (0.0340)	**0.000229** (0.0080)	**-0.022** (0.0230)	**-0.022** (0.0230)	**-0.0145** (0.0530)
Standard deviation	-0.5028261 (0.1530)	-0.0189176 (0.2750)	**-0.312519** (0.1910)	**-0.312519** (0.1910)	**-0.4166808** (0.0290)
Dividend yield	-0.0049875 (0.2560)	0.0002362 (0.3310)	**-0.0049363** (0.0880)	**-0.0049363** (0.0880)	-0.0031689 (0.1700)
Property & plant as a percentage of book value	0.0001145 (0.7160)	**0.00005** (0.0140)	-0.0000902 (0.7090)	-0.0000902 (0.7090)	-0.0001702 (0.4090)
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.1079	0.0006	0.1771	0.1771	0.1099

Table XI: Panel D: (2 year percentile version) Probit Model with a Dummy Variable for the Top 50% of the Industry for the Likelihood of Pre-Committing to All Relative Performance in the Respective Portion of Executive Compensation.

This table provides estimates of a probit model where the likelihood of formalizing a relative performance formula into a portion(s) of the executive compensation package is calculated. In the analysis, the dependent variable is equal to 1 if a firm committed to a relative performance mechanism and zero if no committment occurred. Data is gathered from firm proxies covering the S&P Compustat defined 2000 (fiscal years ending between June 2000 and May 2001) fiscal year for S&P 500 firms. Top 50% dummy is a dummy variable whose value is 1 if the firm's 1-year return ranked in the top 50% of firms in its industry. Two- year industry percentile return is the percentile level return for a firm within all CRSP firms in the same 2-digit SIC-code. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Revenues for the firm are denominated in billions of dollars. Research & development as percentage of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the common stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Dividend yield is the dividend yield of the common stock taken from Compustat at fiscal year end. Property & plant as a percentage of book value is the book value of property and plant as a percentage of the book value of the firm. elative measures include any relative measures, accounting or market related where compensation will depend upon a comparison to some external performance measure. All comp refers to all measures of compensation, bonus refers only to bonus compensation, all LT comp refers only to all long-term compensation, LT comp without options refers to only the long-term compenation which was not delivered in options, and LT cash refers only to long-term compensation which is to be settled in cash. Values in parenthesis are P-values for a two-tailed test that the coefficient estimate equals zero.

	Partial derivatives of outcome probabilities with respect to the independent variables				
	All comp	Bonus	All LT-comp	LT comp without options	LT cash
	(1)	(2)	(3)	(4)	(5)
One-year industry percentile return X top 50% dummy	0.021634 0.0000	-0.2346232 0.0000	0.1319249 0.0000	0.0480022 0.0000	0.0298831 0.0000
Top 50% dummy	0.1725 0.3450	0.1319 0.0000	0.0991 0.0000	0.1231 0.0000	0.0698 0.0000
Homogeneity percentile for firm 2-digit SIC code F(M)	**0.4886747** 0.0000	**0.1890845** 0.0000	**0.3157174** 0.0000	**0.3107283** 0.0000	**0.1654244** 0.0000
One-year industry percentile return X homogeneity percentile X top 50% dummy	**-0.4514648** 0.0000	0.0430033 0.0000	**-0.4649531** 0.0000	**-0.420471** 0.0000	**-0.2577037** 0.0000
Revenues (billions)	-0.0001588 0.0000	-0.0007007 0.0000	0.0000675 0.0000	0.0001693 0.0000	0.000746 0.0000
Research and development as a percent of revenues	**0.011479** 0.0000	0.0032436 0.0000	**0.0142637** 0.0000	0.0083879 0.0000	**0.0089523** 0.0000
Number of board meetings	0.0100495 0.0000	-0.0018134 0.0000	**0.0122885** 0.0000	**0.0106436** 0.0000	0.0036829 0.0000
Market / book value	**-0.031** 0.0000	0.0025 0.0000	**-0.0478** 0.0000	**-0.0392** 0.0000	**-0.0376** 0.0000
Standard deviation	**-3.403928** 0.0000	-0.1655658 0.0000	**-3.884313** 0.0000	**-3.613258** 0.0000	**-2.883015** 0.0000
Dividend yield	0.0128605 0.0000	-0.004947 0.0000	0.0179407 0.0000	0.0200966 0.0000	0.0161303 0.0000
Property & plant as a percentage of book value	0.0015937 0.0000	0.0007808 0.0000	0.0007155 0.0000	0.0001136 0.0000	0.0000603 0.0000
Sample Size	359	359	359	359	359
Model likelihood ratio (p > chi-square)	0.0000	0.0621	0.0000	0.0000	0.0000

Table XII: General Summary Statistics Year 1993-2000 Sample Firms

This table reports summary statistics for the 1993-2000 sample of 11949 firm year observations. Data is from the Standard and Poor's ExecuComp dataset and is composed of the S&P500, S&P Midcap400, and S&P600 SmallCap firms. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Industry percentile returns reflect a firm's percentile return compared to all the firm's in that firm's 2-digit SIC code defined industry.

	Number of firm-year observations	Mean	Median
Market value to book value	11,871	1.72	0.99
Revenues (millions)	11,922	3,302.75	818.36
Research and development as a percent of revenues	11,914	12.15%	0.00%
Property & plant as a percentage of book value	11,927	31.36%	25.45%
Monthly stock return standard deviation measured over the prior 60 months	9,704	10.61%	9.52%
Homogeneity percentile for firm 2-digit SIC code	11,933	44.51%	41.02%
Herfindahl percentile for firm 4-digit SIC code	3,898	50.12%	46.60%
Number of board meetings	11,422	7.24	7
Percentage who are board members*	10,649	98.92%	N/A

* Statistics represent data for CEOs.

Table XIII: Correlation Table for Variables in the 1993-2000 Post-Performance Sample

This table reports the correlation coefficient between all variables utilized in the regression analysis for the 1993-2000 sample year firms. Data is from the Standard and Poor's ExecuComp S&P500 dataset as well as from CRSP. Dollar returns to the firm are 1995-inflation adjusted dollar returns to total common shareholders. Dollar returns to the industry index are 1995-inflation adjusted dollar returns invested in the index with an initial investment equal to that of the firm's total beginning common stock value. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. Research & development as percent of revenues is the total amount spent on research and development as a percentage of the fiscal year revenues. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Market/book value is the ratio of the market value of all common stock outstanding to the book value of the commons stock. Standard deviation is the standard deviation of the returns on common stock, measured monthly over the preceding 5-year period. Director dummy is equal to one if an executive was a member of the company's board of directors. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Property & plant as a percentage of book value of the firm.

	Total direct compensation	Dollar returns to firm	Dollar returns to industry index 2-digit SIC	Homog-geneity percentile for firm 2-digit SIC	CEO dummy	Revenue	Research and devel-opment as a percent of revenue	Market to book value	Common stock return standard deviation	Director dummy	Number of board meetings	Property and plant plant as a percent book value
Total direct compensation	**1.0000**											
Dollar returns to firm	**0.0972**	**1.0000**										
Dollar returns to industry index 2-digit SIC code	**0.0730**	**0.3862**	**1.0000**									
Homogeity percentile for firm 2-digit SIC code	**(0.0094)**	**(0.0200)**	**(0.0212)**	**1.0000**								
CEO dummy	**0.1455**	0.0014	(0.0003)	0.0063	**1.0000**							
Revenue	**0.1734**	**0.2562**	**0.1802**	**0.0141**	**0.0077**	**1.0000**						
Research and development as a percent of revenues	(0.0049)	(0.0017)	(0.0017)	**(0.0103)**	(0.0027)	**(0.0097)**	**1.0000**					
Market value to book value	**0.0624**	**0.2254**	**0.0579**	**(0.1278)**	(0.0042)	**(0.0512)**	**0.0478**	**1.0000**				
Monthly stock return standard deviation measured over the prior 60 months	**0.0158**	**(0.0450)**	**(0.0392)**	**(0.1971)**	(0.0016)	**(0.1670)**	**0.0523**	**0.2200**	**1.0000**			
Director dummy	**0.1349**	0.0032	0.0023	**0.0110**	**0.5865**	**0.0181**	**(0.0084)**	**(0.0080)**	**(0.0168)**	**1.0000**		
Number of board meetings	**0.0605**	**0.0226**	**0.0198**	**0.1062**	(0.0054)	**0.1246**	**(0.0195)**	**(0.0539)**	**(0.0281)**	**(0.0476)**	**1.0000**	
Property and plant as percent of book value	**(0.0768)**	**(0.0367)**	**(0.0167)**	**0.3366**	**0.0096**	**0.0185**	**(0.0136)**	**(0.1320)**	**(0.2565)**	(0.0060)	**0.0395**	**1.0000**

Bold values denotes significance at the 95% confidence level or better.

Table XIV A: Summary Statistics for Executive Compensation Components For 1995

This table reports summary statistics for the 1995 sample year executive compensation components, in 1995 dollars. All amounts data amounts are in thousands of dollars and are based on data from the Standard and Poor's ExecuComp dataset. Short-term compensation consists of Salary, Bonus and Other annual compensation. Total Current Compensation (TCC) consists of Salary and Bonus. Long-term compensation consists of restricted stock grants, stock option grants (valued using a Black-Scholes value), LT incentive plan payouts, and All other LT compensation. Total compensation consists of short-term compensation plus long-term compensation.

Panel A **1995 Year**	Mean	Median	25th percentile	75th percentile	Standard Deviation
CEOs (N = 1552)					
Total compensation (TDC)	**2257**	**1307**	731	2520	3602
Short-term compensation	1052	760	484	1206	1863
Salary	528	467	330	656	293
Bonus	492	252	67	550	1778
Total current compensation (TCC)	1020	745	474	1169	1849
Other annual	31	0	0	5	137
Long-term compensation	1205	468	90	1203	2724
Restricted stock grant	147	0	0	0	627
Stock option grant	848	240	0	808	2439
LT incentive plan payouts	117	0	0	0	506
All other	92	17	5	65	351
Long-term share of total	**0.368**	**0.367**	0.125	0.569	0.261
Non-CEOs (N = 9061)					
Total compensation (TDC)	**908**	**529**	310	987	1434
Short-term compensation	434	323	211	514	428
Salary	251	216	157	305	144
Bonus	170	90	28	200	332
Total current compensation (TCC)	421	316	207	500	411
Other annual	13	0	0	0	78
Long-term compensation	450	146	317	430	1170
Restricted stock grant	57	0	0	0	285
Stock option grant	298	75	0	260	966
LT incentive plan payouts	43	0	0	0	233
All other	43	8	2	23	342
Long-term share of total	**0.321**	**0.305**	0.096	0.496	0.243

Table XIV B: Summary Statistics for Executive Compensation Components For 2000

This table reports summary statistics for the 2000 sample year executive compensation components, in 1995 dollars. All amounts data amounts are in thousands of dollars and are based on data from the Standard and Poor's ExecuComp dataset. Short-term compensation consists of Salary, Bonus and Other annual compensation. Total Current Compensation (TCC) consists of Salary and Bonus. Long-term compensation consists of restricted stock grants, stock option grants (valued using a Black-Scholes value), LT incentive plan payouts, and All other LT compensation. Total compensation consists of short-term compensation plus long-term compensation.

Panel B **2000 Year**	Mean	Median	25th percentile	75th percentile	Standard Deviation
CEOs (N = 1414)					
Total compensation (TDC)	**6363**	**2327**	1079	5114	21856
Short-term compensation	1352	862	529	1496	2579
Salary	551	507	352	706	301
Bonus	757	327	80	761	2494
Total current compensation (TCC)	1308	838	525	1428	2560
Other annual	44	0	0	7	263
Long-term compensation	5012	1157	279	3556	19963
Restricted stock grant	465	0	0	0	2787
Stock option grant	4143	808	88	2677	19321
LT incentive plan payouts	178	0	0	0	1033
All other	225	21	4	76	1466
Long-term share of total	**0.518**	**0.558**	0.307	0.762	0.297
Non-CEOs (N = 5971)					
Total compensation (TDC)	**2347**	**912**	470	1926	6086
Short-term compensation	606	397	259	658	946
Salary	290	246	185	353	165
Bonus	300	132	44	288	867
Total current compensation (TCC)	590	388	253	635	931
Other annual	16	0	0	1	132
Long-term compensation	1740	421	120	1251	5779
Restricted stock grant	157	0	0	0	767
Stock option grant	1421	283	55	949	5418
LT incentive plan payouts	65	0	0	0	432
All other	97	10	3	29	1067
Long-term share of total	**0.481**	**0.498**	0.27	0.706	0.278

Table XV: OLS Regressions of Pay Sensitivity (Total Compensation) of All Proxy Named Executives

Table estimates OLS regressions of the pay-performance sensitivity based on the ExecuComp and U.S. Census of Manufacturing datasets. The dependent variable is total direct compensation (TDC1) and its changes where noted. Values in parenthesis are p-values based on robust standard errors from relaxing the assumption of intra-firm independence. Variables are listed in the order that they appear in the regression model. Dollar returns to the firm are 1995-inflation adjusted dollar returns to total common shareholders. Dollar returns to the industry index are 1995-inflation adjusted dollar returns invested in the index with an initial investment equal to that of the firm's total beginning common stock value. Herfindahl percentile is the cumulative density function value of the firm's 4-digit SIC code that is taken from The Commerce Departments's Census of Manufacturers. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. CEO indicator equals 1 if the executive was the firm's CEO for the majority of the year and zero otherwise. Revenues for the firm are denominated in billions of dollars. Research and development as percent of revenue is the total amount spent on research and development as a percentage of the fiscal year revenue. Standard Deviation is the standard deviation of the firm's real returns over the prior 60-months. Director Indicator equals 1 if the executive is a director of the firm and zero otherwise. No. of Board Meetings is the number of board meetings held by the board of directors during the fiscal year. Property & Plant as a percent of Book Value is the book value of Property and Plant as a percentage of the book value of the firm. The coefficients for the year indicator variables are not shown.

	1993-2000 total direct compensation (TDC1) data for all proxy named executives					
	Manufacturing firms				Non-manufacturing firms	
	Total direct comp	Changes in total direct comp	Total direct comp	Changes in total direct comp	Total direct comp	Changes in total direct comp
Dependent variable is total direct compensation (TDC1)	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	**-519.506**	-525.2921	**-310.847**	-358.228	**-1262.74**	**-1341.373**
	(0.082)	(.118)	(.022)	(.246)	(.007)	(.011)
Dollar returns to firm	**0.060301**	0.0805331	**0.057432**	**0.08286**	-0.23552	-0.309533
	(0.049)	(.102)	(.089)	(.037)	(.286)	(.206)
Dollar returns to industry index 2-digit SIC code	**0.21905**	**0.2049995**	0.016146	-0.00209	0.18274	0.2396166
	(.032)	(.080)	(.664)	(.947)	(.268)	(.191)
Herfindahl percentile for firm 4-digit SIC code: F(H)	331.3618	254.4366				
	(.166)	(.345)				
Dollar returns to firm X Herfindahl percentile	0.001498	0.0186936				
	(.978)	(.816)				
Dollar returns to industry index X Herfindahl percentile	**-0.39517**	**-0.4155952**				
	(.017)	(.056)				
Homogeneity percentile for firm 2-digit SIC code: F(M)	-409.977	-309.965	**-414.801**	-296.848	**781.4804**	**627.826**
	(.107)	(.323)	(.079)	(.329)	(.003)	(.029)
Dollar returns to firm X homogeneity percentile	**-0.13518**	**-0.1708829**	-0.10401	-0.13923	0.448365	0.5873671
	(.052)	(.056)	(.206)	(.134)	(.200)	(.144)
Dollar returns to industry index X homogeneity percentil	-0.02206	0.0502361	-0.03756	0.03815	-0.06495	-0.146962
	(.878)	(.706)	(.809)	(.777)	(.808)	(.629)
CEO indicator	**1469.122**	**1667.75**	**1460.42**	**1665.57**	**1435.842**	**1539.787**
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Revenue	**64.93658**	**63.14842**	**68.43975**	**64.8627**	**132.329**	**133.3079**
	(.000)	(.000)	(.001)	(.000)	(.013)	(.021)
Research and development as a percent of revenue	-2.79488	-2.935139	-1.49429	-1.61707	**-8.12103**	**-9.96231**
	(0.680)	(.682)	(.824)	(.822)	(.048)	(.033)
Market/book value	**365.8203**	**350.8581**	**353.7716**	**338.385**	**373.7057**	**409.8106**
	(.000)	(.000)	(.000)	(.000)	(.001)	(.001)
Standard deviation	**-2908.45**	**-3998.232**	**-3045.64**	**-4056.2**	**2860.379**	**2672.582**
	(0.073)	(0.044)	(.07)	(.042)	(.097)	(.146)
Director indicator	**863.4124**	**677.3111**	**876.8386**	**686.194**	**1256.108**	**1124.849**
	(0.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Number of board meetings	**116.0144**	**137.3957**	**112.7899**	**133.039**	**84.58242**	**84.63091**
	(0.000)	(.000)	(.000)	(.000)	(.029)	(.08)
Property & plant as a percent of book value	**-10.2381**	**-9.889906**	**-10.9127**	**-10.5473**	**-17.4711**	**-15.74776**
	(0.004)	(0.021)	(.003)	(.016)	(.000)	(.000)
Sample Size	18023	14268	18023	14268	23632	18824
Adjusted R^2	0.223	0.0923	0.201	0.0842	0.0883	0.0732

Table XVI: OLS Regressions of Pay Sensitivity (Total Cash Compensation) of All Proxy Named Executives

Table estimates OLS regressions of the pay-performance sensitivity based on the ExecuComp and U.S. Census of Manufacturing datasets. The dependent variable is total cash compensation (TCC) and its changes where noted. Values in parenthesis are p-values based on robust standard errors from relaxing the assumption of intra-firm independence. Dollar returns to the firm are 1995-inflation adjusted dollar returns to total common shareholders. Dollar returns to the industry index are 1995-inflation adjusted dollar returns invested in the index with an initial investment equal to that of the firm's total beginning common stock value. Herfindahl percentile is the cumulative density function value of the firm's 4-digit SIC code that is taken from The Commerce Departments's Census of Manufacturers. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. CEO indicator equals 1 if the executive was the firm's CEO for the majority of the year and zero otherwise. Revenues for the firm are denominated in billions of dollars. Research and development as percent of revenue is the total amount spent on research and development as a percentage of the fiscal year revenue. StandardDeviation is the standard deviation of the firm's real returns over the prior 60-months. Director Indicator equals 1 if the executive is a director of the firm and zero otherwise. No. of Board Meetings is the number of board meetings held by the board of directors during the fiscal year. Property & Plant as a percent of Book Value is the book value of Property and Plant as a percentage of the book value of the firm. The coefficients for the year indicator variables are not shown.

	1993-2000 total cash compensation (TCC) data for all proxy named executives					
	Manufacturing Firms				Non-manufacturing	
	Total direct comp	Changes in total direct comp	Total direct comp	Changes in total direct comp	Total direct comp	Changes in total direct comp
Dependent variable is total cash compensation (TCC)	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	**409.961** (0.000)	**435.851** (0.000)	**436.5217** (0.000)	**458.6843** (0.000)	**337.938** (0.000)	**170.2655** (.226)
Dollar returns to firm	0.011705 (0.224)	0.0108765 (.359)	**0.015131** (.019)	**0.014058** (.096)	-0.01184 (.412)	-0.008258 (.599)
Dollar returns to industry index 2-digit SIC code	**0.022594** (.022)	**0.0194122** (.042)	-0.00401 (.508)	-0.00221 (.802)	-0.01326 (.248)	**-0.023319** (.071)
Herfindahl percentile for firm 4-digit SIC code: F(H)	44.73617 (.365)	38.0153 (.573)				
Dollar returns to firm X Herfindahl percentile	0.00766 (.549)	0.0071877 (.627)				
Dollar returns to industry index X Herfindahl percentile	**-0.0537** (.000)	**-0.0438796** (.006)				
Homogeneity percentile for firm 2-digit SIC code: F(M)	-45.9005 (.514)	-58.23247 (.462)	-44.9591 (.519)	-58.233 (.470)	**252.7316** (0.000)	**450.5804** (.022)
Dollar returns to firm X homogeneity percentile	-0.02761 (.162)	-0.0244843 (.394)	-0.02466 (.248)	-0.02217 (.450)	0.052133 (.100)	0.0420865 (.237)
Dollar returns to industry index X homogeneity percentile	0.024624 (.360)	0.0185265 (.660)	0.02043 (.496)	0.014797 (.721)	0.041967 (.122)	**0.0601277** (.074)
CEO indicator	**511.5994** (.000)	**429.8962** (.000)	**510.3889** (.000)	**428.667** (.000)	**382.3851** (.000)	169.8612 (.349)
Revenue	**15.96491** (.000)	**15.28901** (.000)	**16.41894** (.000)	**15.75759** (.000)	**26.72557** (.004)	**29.46848** (.005)
Research and development as a percent of revenue	-0.04039 (0.954)	-0.0660933 (.940)	0.116854 (.872)	0.071227 (.937)	-0.84007 (.147)	-0.589566 (.296)
Market/book value	14.3324 (.172)	**19.3227** (.099)	12.9222 (.220)	18.0786 (.118)	3.3951 (.825)	17.2943 (.366)
Standard deviation	**-1842.71** (.000)	**-2256.187** (.000)	**-1853.89** (.000)	**-2267.35** (.000)	**-472.703** (.071)	-494.123 (.173)
Director indicator	**276.4412** (0.000)	**280.0796** (.000)	**278.328** (.000)	**282.0009** (.000)	**356.3065** (.000)	**356.4514** (.000)
Number of board meetings	**15.61427** (0.000)	**16.7176** (.000)	**15.2414** (.000)	**16.37304** (.000)	4.290782 (.441)	4.604106 (.502)
Property & plant as a percent of book value	**-3.00489** (.000)	**-3.6863224** (.000)	**-3.07859** (.001)	**-3.74995** (.000)	**-6.01229** (.000)	**-6.50405** (.000)
Sample Size	20901	18292	20901	18292	26782	23354
Adjusted R^2	0.4084	0.0677	0.397	0.0663	0.1537	0.0068

Table XVII: OLS Regressions of Pay Sensitivity (Total Compensation) of All Proxy Named Executives

Table estimates OLS regressions of the pay-performance sensitivity based on the ExecuComp and U.S. Census of Manufacturing datasets. The dependent variable is total rirect compensation (TDC1) and its changes where noted. Values in parenthesis are p-values based on robust standard errors from relaxing the assumption of intra-firm independence. Dollar returns to the firm are 1995-inflation adjusted dollar returns to total common shareholders. Dollar returns to the industry index are 1995-inflation adjusted dollar returns invested in the index with an initial investment equal to that of the firm's total beginning common stock value. Top is an indicator variable equal to one if the firm has performed in the top half of its industry in the preceding year. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. CEO indicator equals 1 if the executive was the firm's CEO for the majority of the year and zero otherwise. Revenues for the firm are denominated in billions of dollars. Research and development as percent of revenue is the total amount spent on research and development as a percentage of the fiscal year revenue. Standard Deviation is the standard deviation of the firm's real returns over the prior 60-months. Director indicator equals 1 if the executive is a director of the firm and zero otherwise. Number of Board Meetings is the number of board meetings held by the board of directors during the fiscal year. Property & plant as a percent of book value is the book value of property and plant as a percentage of the book value of the firm. The coefficients for the year indicator variables are not shown.

	1993-2000 total direct compensation (TDC1) data for all proxy named executives					
	All firms		Manufacturing firms		Non-manufacturing firms	
	Total direct comp	Changes in total direct comp	Total direct comp	Changes in total direct comp	Total direct comp	Changes in total direct comp
Dependent variable is total direct compensation (TDC1)	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	**-447.553**	**-513.5177**	-26.0112	-39.7172	-1113.45	**-1195.717**
	(0.032)	(0.034)	(0.892)	(0.846)	**(0.009)**	(0.014)
Dollar returns to firm	**-0.36469**	**-0.2800964**	**-0.28374**	-0.1031	**-0.62522**	**-0.761936**
	(0.002)	(.048)	(.006)	(.517)	(.025)	(.025)
Dollar returns to firm X top	**0.595824**	**0.5149133**	**0.550837**	**0.379238**	**0.777105**	**0.8844034**
	(0.000)	(0.001)	(0.000)	(0.036)	(0.025)	(0.031)
Dollar returns to industry index 2-digit SIC code	**0.141814**	0.0869208	**0.180632**	**0.083732**	**0.39364**	**0.4352533**
	(.045)	(.269)	(.005)	(.084)	(.048)	(.045)
Dollar returns to industry index X top	**-0.34547**	**-0.2636125**	**-0.42396**	**-0.3096**	**-0.6366**	-0.596155
	(0.004)	(0.077)	(0.000)	(0.026)	(0.089)	(0.130)
Homogeneity percentile for firm 2-digit SIC code: F(M)	380.2855	403.4602	**-517.088**	-384.314	**886.3741**	**762.5542**
	(.101)	(.156)	(.011)	(.224)	(.007)	(.044)
Homogeneity percentile X top	**496.4966**	**600.6317**	**415.9489**	**719.023**	310.8169	299.697
	(.010)	(0.007)	(0.004)	(0.001)	(0.113)	(0.187)
Dollar returns to firm X homogeneity percentile	0.408638	0.2147895	**0.405854**	-0.00139	0.86908	1.101186
	(.242)	(.636)	(.075)	(.997)	(.147)	(.155)
Dollar returns to firm X homogeneity percentile X top	-0.53844	-0.320306	**-0.72451**	-0.30159	-0.89446	-1.038321
	(.131)	(0.471)	(.016)	(.509)	(.215)	(.238)
Dollar returns to industry index X homogeneity percentile	0.171977	0.358277	-0.28189	0.010736	-0.34015	-0.383048
	(.537)	(.284)	(.278)	(.967)	(.444)	(.446)
Dollar returns to industry index X homogeneity percentile X top	-0.14571	-0.4619046	**0.61582**	0.204971	0.487525	0.2789407
	(.736)	(.371)	(.040)	(.533)	(.534)	(.742)
CEO indicator	**1499.427**	**1418.217**	**1555.859**	**1342.609**	**1445.344**	**1548.291**
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Revenue	**68.54576**	**68.98668**	**50.3818**	**52.94499**	**107.5479**	**106.4594**
	(.001)	(.001)	(.000)	(.000)	(.042)	(.064)
Research and development as a percent of revenue	**-0.37046**	**-0.336396**	-0.11366	-0.01515	-4.23783	-5.374187
	(.013)	(.021)	(.128)	(.884)	(.149)	(.103)
Market/book value	**146.5198**	**177.5168**	**158.5341**	**208.3546**	**227.4764**	**241.4237**
	(.000)	(.000)	(.000)	(.001)	(.004)	(.003)
Standard deviation	601.0428	-648.5185	**-2611.28**	**-5435.28**	**2828.147**	2659.521
	(.497)	(0.585)	(.013)	(.014)	(.086)	(.133)
Director indicator	**1032.96**	**871.4606**	**821.176**	**575.8638**	**1257.993**	**1136.291**
	(0.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Number of board meetings	**78.30634**	**80.98488**	**94.06649**	**102.8343**	**74.4526**	**76.54003**
	(0.000)	(.003)	(.000)	(.000)	(.038)	(.093)
Property & plant as a percent of book value	**-17.2043**	**-14.8722**	**-10.605**	-4.97058	**-18.3854**	**-16.84461**
	(0.000)	(0.000)	(.001)	(.243)	(.000)	(.000)
Sample Size	49018	38646	25386	19822	23632	18824
Adjusted R^2	0.1067	0.0451	0.1234	0.0268	0.1061	0.0903

Table XVIII: OLS Regressions of Pay Sensitivity (Total Compensation) for CEOs and Average Non-CEOs per

Table estimates OLS regressions of the pay-performance sensitivity based on the ExecuComp and U.S. Census of Manufacturing datasets. The dependent variable is total direct compensation (TDC1) and its changes where noted. Values in parenthesis are p-values based on robust standard errors from relaxing the assumption of intra-firm independence. Dollar returns to the firm are 1995-inflation adjusted dollar returns to total common shareholders. Dollar returns to the industry index are 1995-inflation adjusted dollar returns invested in the index with an initial investment equal to that of the firm's total beginning common stock value. Top is an indicator variable equal to one if the firm has performed in the top half of its industry in the preceding year. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. CEO indicator equals 1 if the executive was the firm's CEO for the majority of the year and zero otherwise. Revenues for the firm are denominated in billions of dollars. Research and development as percent of revenue is the total amount spent on research and development as a percentage of the fiscal year sales. Standard deviation is the standard deviation of the firm's real returns over the prior 60-months. Director indicator equals 1 if the executive is a director of the firm and zero otherwise. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Property & plant as a percent of book value is the book value of property and plant as a percentage of the book value of the firm. The coefficients for the year indicator variables are not shown.

	1993-2000 Total direct compensation (TDC1) for all proxy executives			
	CEOs		Average non-CEOs per year	
	Total direct comp	Changes in total direct comp	Total direct comp	Changes in total direct comp
Dependent variable is total direct compensation (TDC1)	(1)	(2)	(3)	(4)
Intercept	-505.7969	-529.6185	**297.3887**	204.4398
	(0.536)	(0.554)	(0.014)	(0.168)
Dollar returns to firm	**-0.747078**	-0.249933	**-0.2905742**	**-0.2881334**
	(0.019)	(.562)	(.004)	(.002)
Dollar returns to firm X top	**1.494455**	**1.002659**	**0.415576**	**0.3654208**
	(0.000)	(0.040)	(0.000)	(0.000)
Dollar returns to industry index 2-digit SIC code	**0.2970928**	0.0737317	**0.1045776**	0.0823132
	(.076)	(.662)	(.071)	(.141)
Dollar returns to industry index X top	**-0.9749509**	**-0.7585883**	**-0.2053639**	-0.0907158
	(0.002)	(0.021)	(0.031)	(0.363)
Homogeneity percentile for firm 2-digit SIC code: F(M)	**1175.353**	**1451.119**	143.0867	50.52352
	(.028)	(.042)	(.433)	(.818)
Homogeneity percentile X top	635.0401	**993.1925**	**492.1098**	**537.595**
	(.111)	(0.032)	(0.005)	(0.008)
Dollar returns to firm X homogeneity percentile	1.448064	0.4484377	0.1491071	0.1532228
	(.232)	(0.754)	(.507)	(.497)
Dollar returns to firm X homogeneity percentile X top	-2.223574	-1.242966	-0.1304361	0.0090225
	(.108)	(.437)	(.605)	(.972)
Dollar returns to industry index X homogeneity percentile	0.0430189	0.5700511	0.244991	0.3330439
	(.953)	(0.467)	(.337)	(.202)
Dollar returns to industry index X homogeneity percentile X top	0.6026113	0.0780626	-0.3429979	-0.6878887
	(.466)	(0.931)	(.386)	(.110)
Revenue	**139.9572**	**131.3056**	**50.70852**	**49.23604**
	(.002)	(.002)	(.001)	(.001)
Research and development as a percent of revenue	**-1.009977**	**-0.839313**	**-0.2726691**	**-0.2541473**
	(.021)	(.036)	(.011)	(.023)
Market/book value	**265.8587**	**368.7246**	**105.6227**	**116.6648**
	(.001)	(.003)	(.000)	(.001)
Standard deviation	1307.494	-3863.14	**191.2815**	**77.10191**
	(.591)	(0.349)	(.743)	(.905)
Director indicator	740.5125	645.8824	**517.2492**	**494.7311**
	(.233)	(.355)	(.000)	(.000)
Number of board meetings	**172.8842**	**171.5065**	**51.77554**	**50.41923**
	(.016)	(.020)	(.000)	(.003)
Property & plant as a percent of book value	**-35.3471**	**-30.02487**	**-13.0598**	-10.64867
	(0.000)	(0.000)	(.000)	(.000)
Sample Size	8696	8313	9320	8855
Adjusted R^2	0.0972	0.035	0.2276	0.2114

Table XIX: OLS Regressions of Pay Sensitivity (Total Compensation) for 2001 Based on 2000 Commitment

Table estimates OLS regressions of the pay-performance sensitivity based on the 2000 pre-commitment dataset for the 2001 performance year. The dependent variable is total direct compensation (TDC1) and its changes where noted. Values in parenthesis are p-values based on robust standard errors from relaxing the assumption of intra-firm independence. Dollar returns to the firm are 1995-inflation adjusted dollar returns to total common shareholders. Dollar returns to the industry index are 1995-inflation adjusted dollar returns invested in the index with an initial investment equal to that of the firm's total beginning common stock value. Top is an indicator variable equal to one if the firm has performed in the top half of its industry in the preceding year. Homogeneity percentile is the cumulative density function value of the firm's 2-digit SIC code where the initial values are taken from Parrino (1997), P. 189. CEO indicator equals 1 if the executive was the firm's CEO for the majority of the year and zero otherwise. Revenues for the firm are denominated in billions of dollars. Research and development as percent of revenue is the total amount spent on research and development as a percentage of the fiscal year sales. Standard deviation is the standard deviation of the firm's real returns over the prior 60-months. Director indicator equals 1 if the executive is a director of the firm and zero otherwise. Number of board meetings is the number of board meetings held by the board of directors during the fiscal year. Property & plant as a percent of book value is the book value of property and plant as a percentage of the book value of the firm.

	2001 Total direct compensation (TDC1) data for all proxy named executives from the 2000 S&P 500 sample			
	Industry RPE commitment firms		No RPE commitment firms	
Dependent variable is total direct compensation (TDC1)	Total direct comp (1)	Changes in total direct comp (2)	Total direct comp (3)	Changes in total direct comp (4)
Intercept	-17.3624 (0.993)	332.8921 (0.881)	**-3846.238** (0.062)	**-6603.176** (0.085)
Dollar returns to firm	**0.1144283** (0.052)	0.0531775 (.438)	**-0.2587139** (.000)	**-0.2900475** (.000)
Dollar returns to firm X top	-0.1422332 (0.640)	0.0897937 (0.770)	**0.2333428** (0.009)	**0.2873372** (0.001)
Dollar returns to industry index 2-digit SIC code	**-0.3027818** (.008)	-0.1383221 (.298)	0.1348846 (.480)	**0.261214** (.085)
Dollar returns to industry index X top	**-0.5718404** (.007)	**-0.6729606** (0.003)	-0.0687229 (0.713)	-0.1958079 (0.203)
Homogeneity percentile for firm 2-digit SIC code: F(M)	4371.714 (.115)	**6130.738** (.053)	510.6426 (.762)	1132.787 (.545)
Homogeneity percentile X top	-2116.982 (.260)	-3006.62 (0.157)	-951.6783 (0.605)	-2290.651 (0.303)
Dollar returns to firm X homogeneity percentile	-0.0113812 (.931)	0.2211944 (0.155)	0.3288718 (.186)	**0.4293859** (.092)
Dollar returns to firm X homogeneity percentile X top	-0.2052329 (.652)	-0.5589396 (.222)	-0.3078964 (.369)	-0.4841007 (.216)
Dollar returns to industry index X homogeneity percentile	0.2957719 (.537)	-0.1058404 (0.848)	-0.4377441 (.352)	**-0.6811044** (.080)
Dollar returns to industry index X homogeneity percentile X top	0.7284829 (.216)	0.9296521 (0.151)	0.0072868 (.989)	0.1597481 (.736)
CEO indicator	**2482.511** (.001)	**2903.188** (.000)	**6027.123** (.001)	**6739.62** (.004)
Revenue	21.3752 (.107)	**35.77568** (.033)	**101.541** (.015)	**121.1015** (.012)
Research and development as a percent of revenue	54.46126 (.211)	35.21137 (.437)	**-244.9416** (.081)	**-326.6912** (.063)
Market/book value	388.6185 (.408)	512.4329 (.308)	**737.6162** (.053)	592.9531 (.112)
Standard deviation	922.8812 (.915)	-1120.8000 (0.276)	**61420.16** (.023)	68212.36 (.037)
Director indicator	**3177.539** (.000)	**2635.441** (.002)	**3599.928** (.018)	1865.899 (.402)
Number of board meetings	101.478 (.407)	102.1549 (.459)	277.4961 (.105)	158.9967 (.282)
Property & plant as a percent of book value	**-37.55421** (0.044)	**-43.22525** (0.038)	**-59.14326** (.004)	**-52.17253** (.036)
Sample Size	515	420	1323	1029
Adjusted R^2	0.322	0.263	0.1804	0.1128

Figure 1: Simple Representation of the Effort-Compensation Time Line

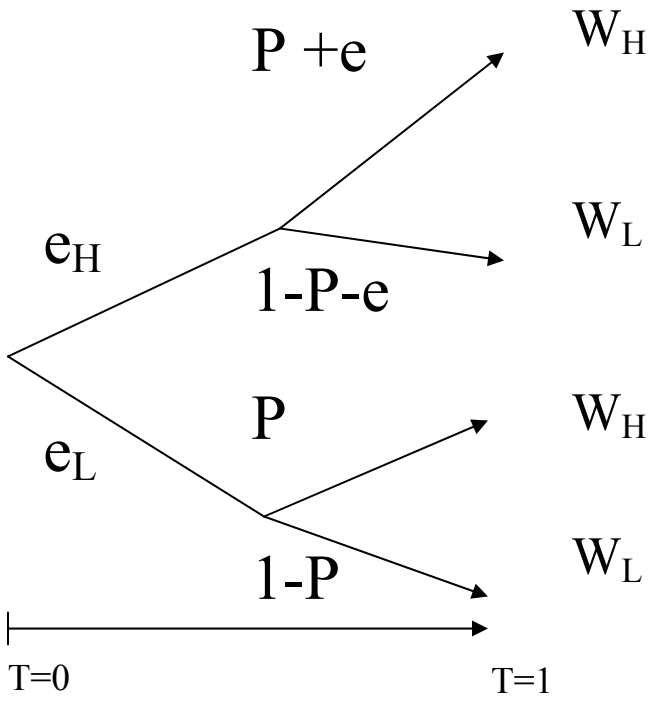
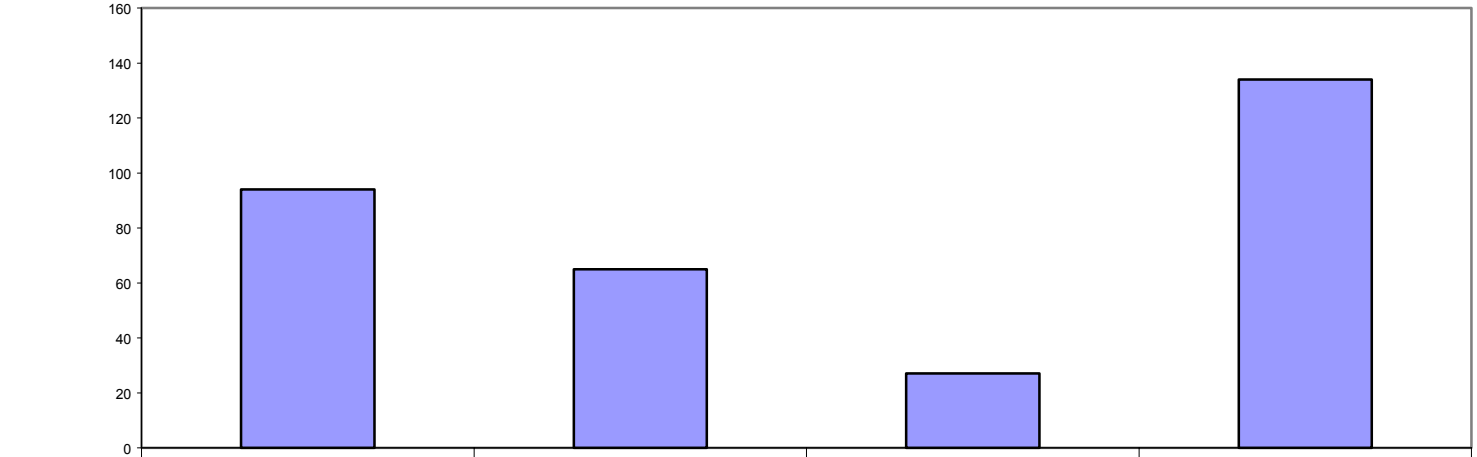
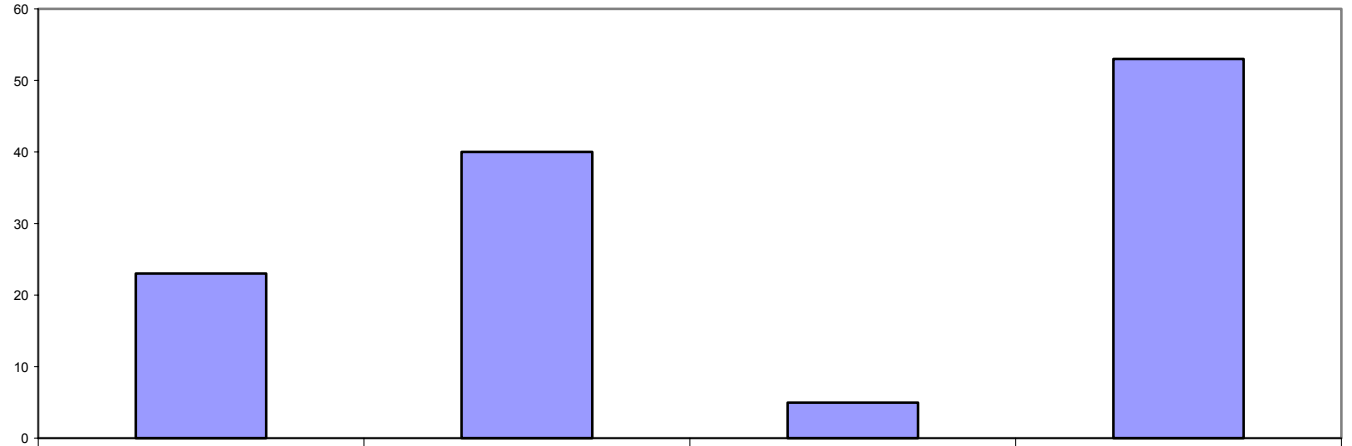


Figure 2: All Compensation Choices Pre-Commitment Frequency - 403 Total Sample Firms



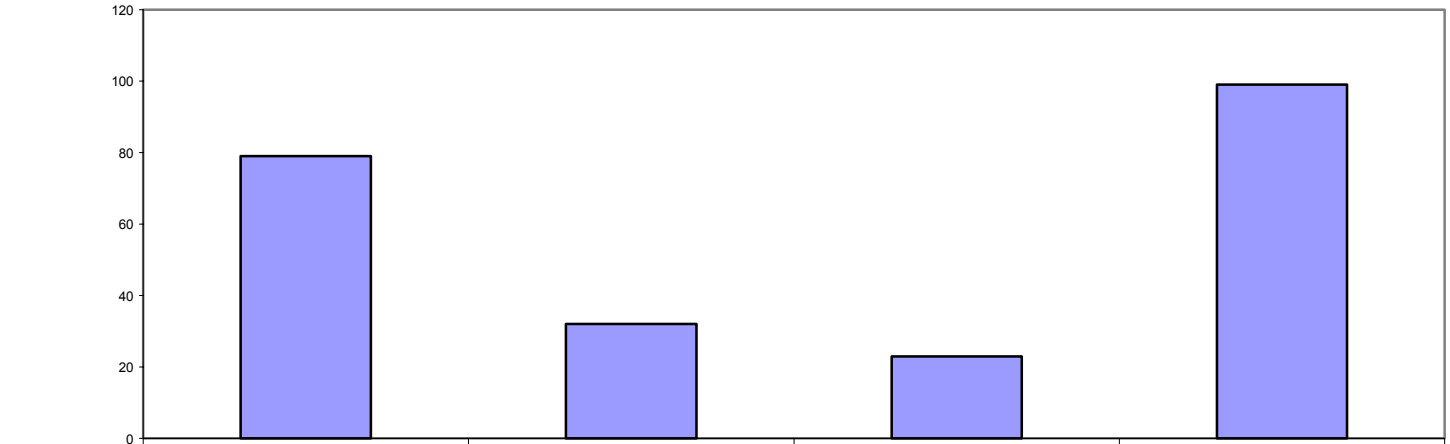
	Industry RPE	Accounting RPE	Broad Market RPE	All Relative RPE
Frequency	94	65	27	134

Figure 3: Bonus Pre-Commitment Frequency - 403 Total Sample Firms



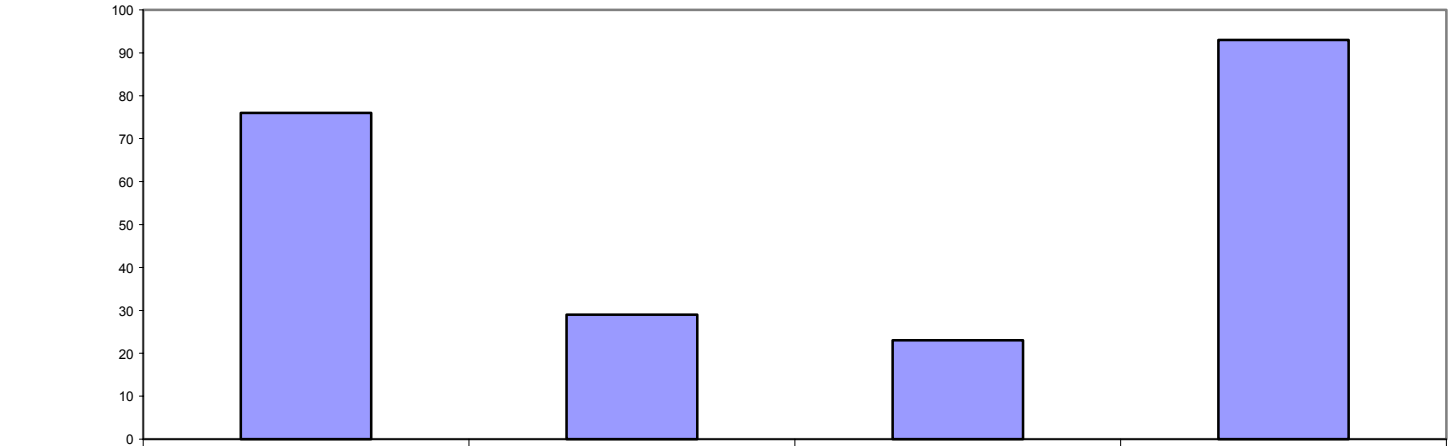
	Industry RPE	Accounting RPE	Broad Market RPE	All Relative RPE
Frequency	23	40	5	53

Figure 4: All Long-Term Compensation Pre-Commitment Frequency - 403 Total Sample Firms



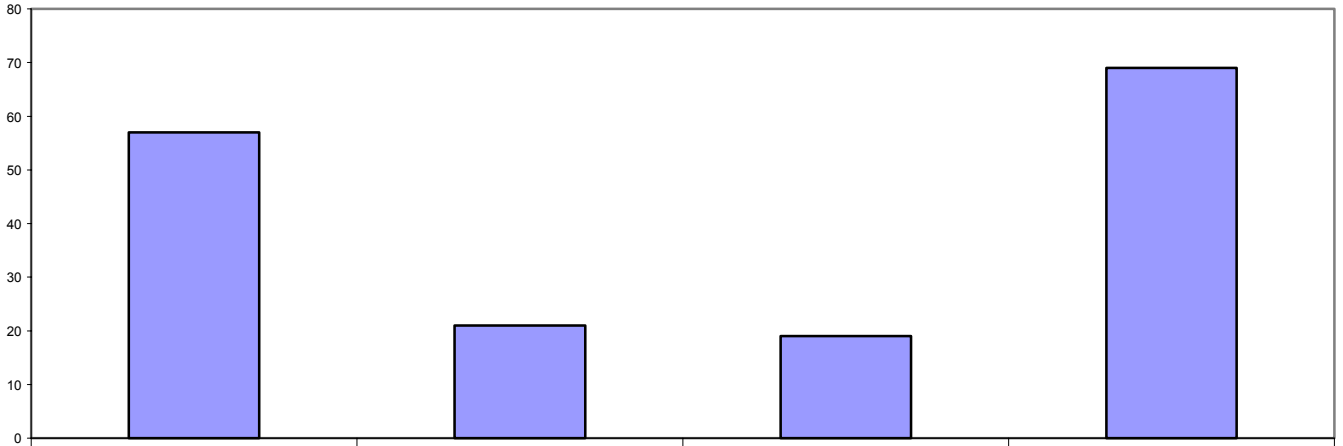
	Industry RPE	Accounting RPE	Broad Market RPE	All Relative RPE
Frequency	79	32	23	99

Figure 5: All Long-Term Compensation Excluding Options Pre-Commitment Frequency - 403 Total Sample Firms



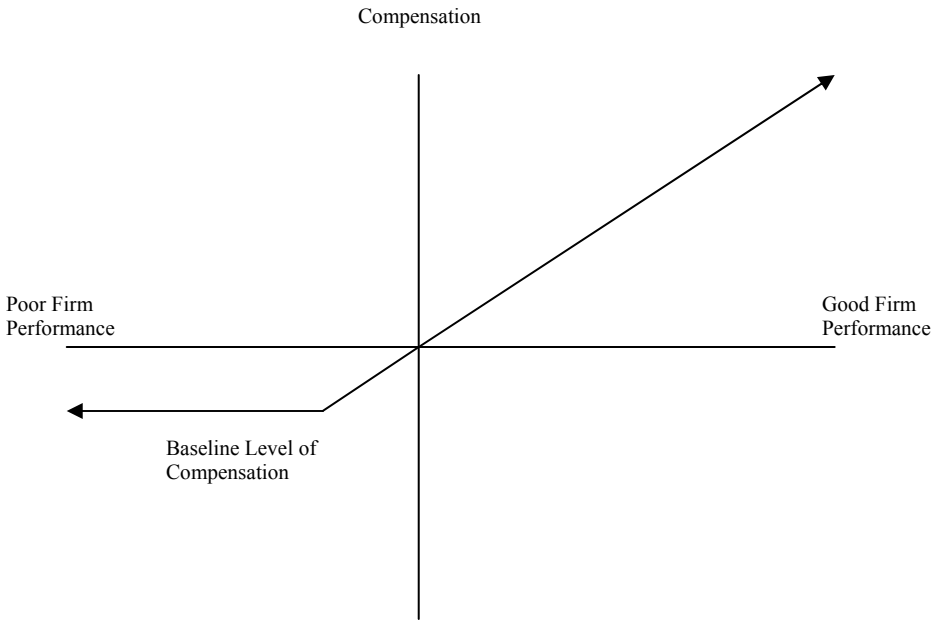
	Industry RPE	Accounting RPE	Broad Market RPE	All Relative RPE
Frequency	76	29	23	93

Figure 6: All Long-Term Cash Compensation Pre-Commitment Frequency - 403 Total Sample Firms



	Industry RPE	Accounting RPE	Broad Market RPE	All Relative RPE
Frequency	57	21	19	69

Figure 7: Representation of Baseline Level of Compensation for Low Performance



Appendix

Practical Frictions in Executive Compensation

Accounting Considerations

Options

If a compensatory option is written at-the-money or out-of-the-money with a fixed strike price and a fixed exercise date then the issuing firm may choose not to recognize an expense for that option. Prior to the corporate governance and accounting crisis of late 2001, it was very uncommon to elect to expense compensatory options. It is not this paper's purpose to investigate the reasons for such an aversion to non-cash expenses so I assume the goal of reducing all income statement expenses an exogenous characteristic. Indexed options do not fit the rule of having a fixed strike price so they must be expensed if that particular RPE compensation method is elected. Consequently, indexed options have been a choice for a very small minority of firms. If a firm wants to involve RPE into option payouts, the primary methods have been through vesting restrictions and/or the initial calculation of options granted. The vesting restrictions will generally be performance accelerated where a predetermined vesting schedule is accelerated due to predetermined performance goal achievement. When RPE is involved

in the initial option grant calculation, a target number of options to be granted is modified according to a predetermined RPE performance schedule based upon a prior historical period.

Restricted Stock

According to current accounting rules all grants of restricted stock are expensed. Therefore, incorporating an RPE modification into a grant calculation or vesting restriction will result in similar expenses compared to a restricted stock grant without such an RPE mechanism.

Cash Based Compensation

Cash based compensation will result in an expense. From an income statement perspective, RPE based cash compensation contains no additional expense burden over non-RPE based cash compensation. Cash based compensation does have the principal drawback that a significant cash payout can have a large impact on a firm's cash flow and that payout is generally unknown at the time of grant. Therefore, it is both cash and income statement expensive to deliver significant value (relative to the target compensation package) through cash compensation, and it is rare to see a plan constructed without a maximum payout limitation. That limitation is not generally instituted in equity based plans.

Vesting Provisions

While vesting provisions do not materially increase or decrease the initial grant amounts, they do affect the amount of unvested value that an executive has in control. Consequently, for retention purposes, an accelerated vesting event is usually followed by additional grants in order to maintain a material amount of unvested value for an

executive. This suggests that higher grant amounts in current periods may be the partial result of achieving prior period goals.

Target Level of Compensation

Compensation convention incorporates a target level of compensation for an executive with a given span of responsibility within a given industry. Competitive compensation levels are generally well known within an industry as well as outside of an industry. [11] This introduces the possibility of a voluntary departure due to low expected compensation levels. Target compensation is usually composed of cash compensation, restricted stock that is easy to value, and options that are by convention denominated in Black-Scholes value. Compensation convention treats dollar values of cash and restricted stock compensation on equal footing with Black-Scholes option compensation dollars. As such, it is generally inexpensive to the income statement to improve an executive's compensation package through an option grant. This helps to explain the large portion of compensation value awarded through options.

[11] Target levels of compensation are known either through survey information or through outside recruiters who have an incentive to reveal this information to their potential clients.

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Vita

Lawrence Wendell Licon was born in El Paso, Texas on November 18, 1963, the son of Guillermo and Rebecca Licon. After graduating from William H. Burges High School in El Paso, Texas he entered The University of Texas at Austin where he received a Bachelor of Business Administration in May 1985 and a Master of Business Administration in May 1987. For the next eight years, he was employed as a financial analyst by Liberty Mutual Insurance Company in Boston, Massachusetts and then Electronic Data Systems Corporation in Dallas, Texas. In August 1995 he entered the Graduate School of The University of Texas at Austin. From December 1998 through June 2000 he was employed by Towers Perrin as a compensation consultant and from June 2000 through August 2001 as a compensation advisor with Enron Corporation. From August 2001 to August 2003 he was a visiting instructor at The University of Oklahoma.

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