

*Incentives in Executive Compensation Contracts:
An Examination of Pay-for-Performance*

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I. Introduction

The use of performance incentives in executive compensation contracts heads the current discussion of U.S. corporate governance. Frequent debate stirs among investors, boards of directors, and global business networks over the suitability and efficiency of incentive pay as the leading component of executive compensation. Do performance based incentives appropriately motivate top executives to work hard at maximizing company and shareholder returns? The literature questions which types of factors influence the sensitivity between executive pay and firm performance and consequently the efficacy of incentive compensation. This paper provides both a theoretical and an empirical analysis of this topic.

Executive pay has experienced extraordinary growth over the past decade, primarily due to the use of stock options and additional forms of long term and incentive compensation. With this growth, however, has come widespread concern amongst investors and corporate governance critics about the corporate greed that the various forms of equity based incentive payments have come to represent. Significant to this concern is that the explosion of stock options has come to make up about 80 percent of executive compensation packages and subsequently, 15 percent of shares outstanding (Business Week Online: Executive Pay Special Report April 15, 2002). This dramatic increase in executive stock ownership, as a result of the changes in the form of executive compensation, creates an additional concern for investors: a concern of dilution of company ownership away from the shareholders. The evolution of corporate ownership through the implementation of equity-based incentive payments directly affects the

principal-agent relationship among company shareholders and top-level executive management.

The current standing of the U.S. economy is also of great consequence to the relationship of executive pay to company performance within the framework of executive compensation. Economic uncertainty and market instability raises risk as a determining factor for company stock-market performance and consequently for the relationship between firm performance and executive pay.

If corporate America is willing to provide millions of dollars in assets and equity each year for incentive compensation of top executives, is there a payoff to be had by the company and its shareholders? Specifically, is there evidence to support the claim that executive pay is relative to firm performance, thus alleviating the conflict of interest between top executives and company shareholders? If so, what implications does the element of risk have for the relationship between executive pay and company performance, the suitability of incentive payments, and the structure of executive compensation contract?

The intention of this study is to examine the relationship between executive pay and firm performance relative to the structure of the executive compensation contract. The primary analysis tests the relationship between executive pay and firm performance (pay-performance sensitivity) using a principal-agent framework developed by Jensen and Murphy (1990). A specific focus of the empirical testing then continues to examine the impact of risk on the pay-performance sensitivity (incentives), based on the hypotheses of Aggarwal and Samwick (1999). Lastly, the original multiple regression model is modified in the measures of the variables and examined in a comparative

analysis. The results of my empirical study provide strong statistical support for the relationship between firm performance, executive compensation, and risk in the realm of publicly owned corporations. The conclusions are consistent with the principal-agent theory: pay-performance sensitivity, incentive, is reduced by the element of risk.

This paper is organized as follows. Section II presents a discussion of agency theory and the characteristics of the principal-agent model that apply to executive compensation contracts. This theoretical background provides essential information pertaining to the constrained relationship between shareholders and top executives.

Section III continues with a review of previous literature fundamental to the development of my empirical analysis. I incorporate in this review an evaluation of previous estimates of pay-performance sensitivity and the value of the developments resulting from these empirical investigations.

Section IV exhibits the comparative static economic prediction upon which this empirical examination is built. The comparative static prediction presents the relationship between risk and pay-performance sensitivity as established by agency theory. This relationship is integrated in the empirical model to test for the effect of risk on the incentive component of executive pay. The prediction that pay-performance is decreasing in risk associated with firm performance will be tested via econometric analysis.

Section V is divided into two parts pertaining to the development of the empirical model. Part A presents the multiple regression model wherefrom the estimation of pay-performance sensitivity results. Part B provides a description of the data used in the development of the regression analysis. I use current data from 1999 to 2001. This is a

particularly interesting period because of the tremendous swings in stock returns. The basis for the data selections and methodology employed will be justified and the strengths and weaknesses of the sample will be addressed.

I will discuss the testing of the multiple regression model and the results of the empirical analysis in section VI. Formal hypothesis testing is applied to determine if the estimated coefficients are consistent with theoretical expectations. In addition, the regression model is restricted to test for the significance of omitting risk from the pay-performance relationship. Lastly, comparative analyses are conducted to examine differences in pay-performance results using earnings-based versus stock-based performance measures, pay-related wealth versus total compensation, and single year versus multiple year time periods.

This paper concludes with implications for the current study of executive compensation schemes and with suggestions for future research.

II. Agency Theory

Agency Theory and Executive Compensation

The incentive problem of executive compensation is a classic application of the principal-agent model (Jensen and Murphy 1990). What incentives are necessary to match executive goals to shareholder interests? The common agency problem arises from the conflict of interest that inherently exists between the separation of ownership (by shareholders) and control (by the executive) within a corporation. The executive's

objective in choosing particular actions is maximization of his or her personal utility given a certain preference for risk¹. The shareholders' objective is maximization of wealth from investment in the company. It is evident, therefore, that the objectives of the executive and shareholders are not fully aligned within this agency relationship. This is the basis of the principal-agent problem.

The implementation of executive compensation contracts is in fact intended to align the interests of the executive with the interests of the shareholders. Specifically, an executive compensation contract should provide sufficient incentive for the executive to put forth effort towards maximizing returns of the corporation and thus maximizing returns to shareholders (Ehrenberg & Smith 2000). A common mechanism used to establish such an alignment of interests is to tie executive pay with company stock performance.

Over the past decade, the use of such incentive mechanisms has increased to unanticipated levels, causing much attention to be brought to the area of executive compensation contracting. For example, Lawrence Ellison, CEO of The Oracle Corp., received \$706 million in 2001 from exercising 23 million stock options. This incentive-based payoff was extraordinary for a year of plummeting stock-values across most publicly owned companies. While the value of shareholder investments were falling, Ellison had the option to use his compensation "perk" to sell his shares of bull-market valued stock purchases. However, Ellison could also be perceived as a loser, as the value of his options holdings had fallen by more than \$2 billion. Still to many, this "cashing-in" of stock options was excessive compared to the value of the firm's performance to its shareholders. In support of the incentive based compensation plan, The Oracle Corp. had

¹ Executive utility function $U = f(\text{consumption, labor: risk})$.

granted the stock options to Ellison as part of his compensation package over the two-year period of 1999 to 2000, a time when shareholders' stock investments were also appreciating substantially (Business Week Online Special Report April 15, 2002). Thus, during this period, the equity based compensation seemed to properly align the interests of the Oracle executive and the Oracle shareholders, alleviating the principal-agent conflict. This example depicts the type of circumstance that motivates investors, corporate governance critics, and other related parties to question whether there is evidence in fact to support the claim that executive pay is relative to firm performance.

The relationship between shareholders and top executives is affected by two specific principal-agent problems: information asymmetry and unequal distribution of risk among the parties (Kosnik and Bettenhausen 1992). Actions taken by an executive are private knowledge of the executive and are unobservable by the shareholders. For instance, shareholders may have basic knowledge of risks and opportunities associated with a company or a company's industry, however they do not have the ability to observe how executives respond to the associated risks and opportunities. For example, specific risks and opportunities associated with financing subsidiary companies or expanding production capabilities available to the company are not necessarily communicated to its shareholders. Consequently, the shareholders are constrained by this asymmetry of information. (Rosen 1992) In a given context, a risk-averse executive may not choose a particular mode of action that may possibly result in an increase of shareholder wealth because he or she may consider the action to entail too great of a personal risk and therefore too high of a cost for the effort. If personal cost to the executive outweighs the expected personal gain, either from compensation or other rewards, the opportunity will

be considered too risky to pursue. For the shareholders, on the other hand, the risk may very well be one worth taking if the company will benefit from the expected return of the action, given their risk-neutral interest. The evident divergence in preference for risk creates a conflict of interest between the shareholders and the executive. The goal of incentive compensation, relative to this conflict, is thus to reward the executive for assuming additional risk on behalf of the shareholders.

Agency theory suggests a solution to the principal-agent problem. The structure of an executive compensation contract should induce the executive (the agent) to take value-maximizing actions in the interest of increasing shareholder (the principal) wealth. Through pay-performance mechanisms, executive compensation contracts provide incentive for the executive to put forth effort in the interest of shareholders.

Principal-agent models face two constraints fundamental to the executive pay – firm performance relationship. The first constraint is called “individual rationality”. The individual rationality condition specifies that the compensation package must pay a minimum level to be accepted by the agent. Specifically, the utility realized by the agent (executive) from the compensation package offered by the principal must be as least as great as the utility that could possibly be gained by the executive from a package offered in any other alternative arrangement. The second constraint, “incentive compatibility,” is most significant for this discussion. The incentive compatibility condition requires the contract be designed such that the agent chooses actions that maximize the principal’s profits (Rosen 1992). In this context, the intention is to design the compensation contract to provide the executive with enough incentive so his or her actions are compatible with

the profit maximizing objectives of the shareholders. As we will see below, the incentive compatibility condition is complicated by the risk aversion of the executive.

Incentive compensation contracting works as follows. The executive makes management decisions, and the firm performs in response to the action choices. The executive is then paid a share of the proceeds gained from the firm's performance or is granted a reward based on the performance outcome. This share of firm proceeds is the incentive payment of compensation. This is usually a supplement to salary and non-performance based bonus, called the insurance payment in the literature. The goal of the optimal incentive contract is to characterize the share of proceeds paid to executives where there exists optimal balance between insurance and incentive. Theoretically, the optimal contract is found through a two-stage maximization problem. The first stage finds the executive supply of effort that maximizes expected utility given an incentive share of compensation. The second stage solves for the pay-performance sensitivity that maximizes both the shareholders' expected profits and the executive's expected utility given the amount of effort supplied as determined in first stage (Rosen 1992). The incentive compatibility constraint thus requires that the executive pursue actions that maximize personal expected utility and that simultaneously maximize shareholder profits. This requirement is crucial to efficiently solve for the pay-performance sensitivity that maximizes shareholders' profits. Only at this particular level of effort supply is the optimal incentive pay achieved. It is therefore evident that in most circumstances it is difficult and cost ineffective to secure this optimal contract. For these reasons, empirical study must evaluate the pay-performance sensitivity resulting from the executive

compensation contracts in relation to the theoretical predictions of optimal incentive payments.

Risk Aversion

Executive pay-for-performance contracts are complicated by the risk aversion of executives: risk-averse executives suffer disutility from the risky component of the contract and this must be offset by the risk-free or insurance component. For example, a turbulent market environment, such as that brought about by the recent economic conditions, results in high levels of risk and thus decreases the utility of the incentive payment for the executive. This disutility of effort caused by risk in production of effort must be offset by a risk-free component of compensation. This complication matters because a large insurance component of the contract reduces the incentive to maximize shareholder wealth. This section looks into this tradeoff.

First, consider the utility function of a risk-averse executive. To be risk averse, the utility function must be concave, that is exhibit positive but diminishing returns to income (Varian 1996). In addition, the cost (of effort) function for the executive is convex and thus exhibits positive and increasing costs of effort. The executive therefore gains less personal utility, on the margin, from putting forth effort towards maximizing firm and shareholder profits. The executive thus prefers to have the utility, in the present, of the expected value of his or her wealth rather than make a risky decision on behalf of the company and possibly gain the expected utility of his wealth. The expected utility of the executive's wealth is based on possible outcomes of a given action and the respective

probabilities of occurrence. Under the assumption of risk aversion, this expected utility is not as great as the present utility of the expected value of wealth. The risk-averse executive considers it a risky option to give up wealth in the present for a future reward, should the company perform well in response to his or her management decisions. The executive (agent) must make such a decision independent of what would result if effort put towards a risky endeavor were to result in poorer firm performance (Varian 1996). The risk-averse executive must therefore be provided a large enough fixed component of compensation to be persuaded to take the risk that an incentive payment bears. This intuition supports the trade off between insurance and incentive provided by the agency theory.

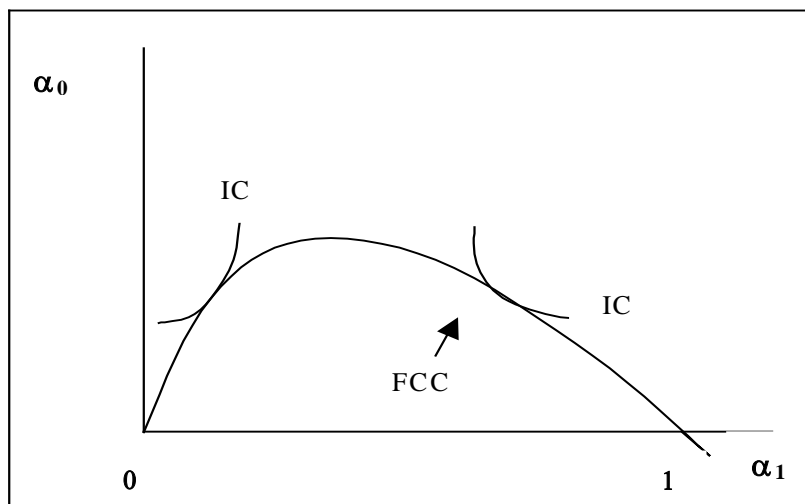
Xianming Zhou presents an intuitive graphical approach to analyzing the predictions of incentive contracting derived from the principal-agent model. Principal-agent theory maintains that compensation contracts are designed to create a trade-off between insurance and incentive. The insurance and incentive parameters, to be formulated into the population regression model for executive pay, make up the space associated with the compensation contract. Equilibrium within the trade-off between insurance and incentive can be characterized by utilization of a “feasible contract curve/indifference curves framework” (Zhou 2002).

This graphical approach nicely illustrates the incentive compatibility constraint predicated by incentive compensation schemes.² Zhou first invokes the agency theory assertion that an executive will choose to put effort towards actions that maximize personal utility. The utility of the executive is a function of the net payoff of realized

compensation and cost of effort. Subject to the incentive compatibility constraint, the optimal incentive contract is designed to maximize executive utility at a level of effort consistent with the profit maximization objectives of the shareholders.

In terms of the graphical analysis, this optimal contract, as defined by incentive compatibility, occurs on the feasible contract curve at the point where the executive achieves utility maximization. Zhou specifically notes that this graphical model assumes the risk neutrality of the shareholders (principal) because “in a competitive labor market, the risk neutral principal earns zero expected profits” (Zhou 2002).

The “Feasible Contract Curve” (Zhou 2002)



The incentive parameter, α_1 , increases from 0 to 1 along the FCC (“feasible contract curve”). At $\alpha_1 = 0$, Zhou derives that the incentive compatibility constraint will yield an insurance payment, α_0 , also equal to 0. As α_1 increases from 0 to 1, greater

² Assumptions relaxed in graphical approach to Xianming Zhou’s graphical depiction of incentive compatibility constraint: a linear contract, exponential utility and quadratic cost of effort. The framework of Zhou’s analysis is subject to first-order qualifications.

effort put forth by the executive results in higher output, which increases both the incentive and insurance components of pay. However, greater incentive pay, depicted by the pay-performance sensitivity α_1 , is also a trade off for less insurance pay α_0 . Thus, Zhou describes the FCC to be upward sloping for low values of α_1 where the marginal product of effort is high and where the “output effect” of the incentive is greater than that of insurance pay. At some point, however, this marginal productivity of effort decreases to a level at which the “output effect” of the incentive component is no longer dominating and the FCC becomes a downward sloping curve. At $\alpha_1=1$, the incentive component makes up total pay and thus reduces the insurance pay to zero.

The executive’s utility function is depicted by an indifference curve located at a point of tangency to the FCC within the contract space. The first stage, of the previously discussed two-stage maximization problem from which the optimal contract is conceived, determines the position of the IC along the FCC. The indifference curve, along which the expected utility remains constant, may either slope upward or downward. The explanation for the slope and position of the indifference curve in the contract space is as follows: higher incentive, α_1 , raises compensation based on greater expected output but simultaneously increases risk. When risk aversion is low and/or when there is a low level of production risk, the incentive component of pay is a “good” to the executive and the IC is downward sloping. However, with increased risk aversion and/or increased production risk, the marginal benefit of an increasing incentive component of pay decreases dramatically, the IC rotates counterclockwise along the FCC, and the curve becomes upward sloping (Zhou 2002). Thus, risk aversion and risk in output production results in smaller pay-performance sensitivity and shifts the optimal-contract equilibrium

along the FCC in a trade-off of incentive for greater insurance pay. This graphical presentation clearly depicts the trade-off between insurance and incentive components of executive compensation predicted by agency theory.

III. Review of Previous Literature

Michael Jensen and Kevin Murphy (1990) completed a classic, preliminary empirical examination of the pay-performance sensitivity and its inference about the predictions of agency theory. Using Forbes survey data from 1973 to 1986, this study tests for evidence that aligning incentives between top executives and company shareholders alleviates the principal-agent problem. Jensen and Murphy carefully identify that there are mechanisms through which such compensation structure can provide value-maximizing incentives. The various mechanisms, which include performance based salary and bonus revision (salary and bonus revised each fiscal year to incorporate additional pay based on company performance) and stock option grants, are examined and the incentive provided by each mechanism is estimated. Jensen and Murphy (1990) establish that a positive statistical relationship did in fact exist between firm performance and executive pay within their sample data. They argue, however, that although the pay-performance sensitivity value is positive and statistically significant, it is too low in magnitude to be consistent with the agency theory prediction of optimal contracting. The results of Jensen's and Murphy's (1990) study reveal that during the 1973-1986 sample period, bonus payments made up 50 percent of CEO compensation, but were not awarded in ways sensitive to market or accounting based performance measures. Even so, Jensen and Murphy (1990) speculate that various private and public

political factors outside of the control of individual firms cause the pay-performance sensitivity variable to be inconsistent with agency theory. In response to their findings, Jensen and Murphy (1990) indicate concern about the resulting absence of management incentives in publicly owned companies and suggest that the significance of the pay-performance relationship is worth looking into at greater depth.

Following Jensen and Murphy (1990), John Garen (1994) also attempts to estimate the extent to which the principal-agent model is able to explain the structure of executive compensation contracts. Garen (1994), however expands on the previous study by taking into account the element of risk in pay-performance sensitivity. His study specifically seeks to analyze the cause of variation in pay-performance sensitivity that arises across a sample of firms (such as the sample used by Jensen and Murphy (1990)).³ Garen (1994) conjectures that it is impossible in an aggregate regression model to determine whether data provided on executive compensation and individual company performance is consistent with agency theory. An estimation of average pay-performance provides insignificant results and gives reason to look more closely at the constraints of the principal-agent model. Thus, Garen (1994) derives a comparative static prediction from a simple economic model that clearly identifies the trade-off between insurance and incentives inherent in agency theory. He finds the comparative static prediction to be appropriately applicable to executive compensation contracting. The data sample (utilized from Jensen and Murphy 1990) is then econometrically tested on the basis of the comparative static prediction. The comparative static approach yields a prediction of how pay-performance sensitivity varies with observable factors exogenous

³ See table 1 from Garen (1994) that displays the distribution of the pay-performance sensitivity across the sample of Jensen and Murphy (1990).

to the compensation contract and performance results. Firm size and stock return volatility are examples of such exogenous factors included in Garen's empirical tests. The principal-agent model is supported if the sample data provides evidence in favor of the comparative static prediction that incentives are negatively related to recognized risk.

The empirical analysis included in Garen's study demonstrates that as risk associated with firm performance increases, the pay-performance sensitivity becomes less significant.⁴ Garen's estimates support the principal-agent model on the basis that the pay-performance sensitivity decreased in the residual standard deviation of firm performance. His results also verify the important factor of firm size in this estimation⁵. While Garen (1994) was able to provide support for the principal-agent model, his results find low levels of significance and weak overall explanatory power. The magnitude of the risk effects of variability in firm returns on the pay-performance sensitivity however offers reason to further investigate this model.

Aggarwal and Samwick (1999) expand on the work of Jensen and Murphy (1990) and Garen (1994) with the specific focus on the comparative static prediction. The prediction set forth by Garen (1994) again states that the principal-agent model expects the pay-performance sensitivity will be decreasing in the variance of firm returns. Aggarwal and Samwick (1999) use more current compensation data (sample period 1993-1996) for CEO's and other top executives from a sample of the 1,500 largest publicly traded firms in the United States. They utilize the CRSP (Center for Research in

⁴ Garen uses data supplied by the Jensen and Murphy (1990) with supplemental information from Compustat. The residual standard deviation in firm returns is employed as the measure of risk.

⁵ Pay-performance sensitivity decreases in risk only when a control variable for firm size is included in Garen's regression analysis

Security Prices Data) to compute variance of firm stock returns. The estimation results of this study support that the pay-performance sensitivity is positive and statistically significant. In addition, they find the coefficient on the interaction of firm performance and variance in firm returns is negative and statistically significant. This empirical evidence supports the principal-agent theory and is consistent with the comparative static prediction of the optimal executive compensation contract.

It is this paper's goal to provide evidence in support of Aggarwal and Samwick's (1999) conjecture and to improve on the empirical examination of executive compensation contracting relative to the predictions of agency theory.

III. Economic Model

This section presents the agency theory model for optimal incentive contracting employed by Aggarwal & Samwick (1999). The wage (ω) is a function of a fixed pay component, α_0 , and an incentive pay component, α_1 , proportional to a measure of company performance. The independent variable π represents firm performance and α_1 is the pay-performance sensitivity. This simple economic model of the principal-agent relationship is the basis for the empirical analysis to follow.

$$\omega = \alpha_0 + \alpha_1 \pi \tag{1}$$

Aggarwal and Samwick (1999) show, however, that an aggregate empirical estimation of the pay-performance sensitivity, (α_1) does not provide a sufficient structure to test the theory. This conjecture corresponds directly to the hypothesis formulated by Garen (1994). Specifically, since individual contracts depend on executive utility, executive aversion to risk, and the various factors that affect individual firm performance, an aggregate model will not properly measure incentive pay.

The comparative static prediction, identified in Garen's (1994) analysis and used in Aggarwal & Samwick's (1999) examination, is based on economic modeling of the "optimal-performance related component," α_1^* , of the compensation contract (Garen 1994). Garen derives α_1^* to be as so:

$$\alpha_1^* = \frac{1}{1 + \rho\kappa\sigma^2} \quad (2)$$

Therefore, the true optimal wage contract is:

$$\omega = \alpha_0 + \left(\frac{1}{1 + \rho\kappa\sigma^2} \right) \pi \quad (3)$$

Equation (2) shows that the optimal performance-related component of the incentive contract is a function of three factors of risk. The factors include the executive's coefficient of absolute risk aversion (ρ), the curvature of the agent's disutility of effort function (κ), and the variance on the measure of firm performance (σ^2). The optimality of this model is that it explicitly infers the negative relationship between risk and pay-performance sensitivity in the incentive component of executive pay. These

three factors influence the optimal pay related component of the executive compensation contract in the same manner: an increase in risk leads to a decrease in the optimal incentive component of executive pay. The risk factors cannot be separated from the model econometrically, so this paper (following Aggarwal & Samwick (1999)) seeks to estimate the overall impact of the variance of firm performance (σ^2) when interacted with firm performance (π).

The theoretical models recognize that as variance in firm returns increases, optimal pay-performance sensitivity of executive compensation decreases, creating less incentive for executives at firms with more volatile stock returns. Aggarwal and Samwick (1999) conjecture that variation in stock return is therefore indicative of risk in the agency model prediction. As a result, it is more generally predicted that there will be greater incentive to perform when there is a lower level of risk involved. The effect of variance of firm performance creates an underestimation of the average pay-performance sensitivity if a variable to identify the risk is not included in the empirical model.

I test the model of optimal executive pay for evidence that a positive pay-performance sensitivity, α_1 , is decreasing in the factor of risk associated with variance in firm performance, σ^2 . The variable to be applied as the measure of risk in my empirical analysis is variance in firm market return. The full econometric model is presented below.

IV. Estimation of Pay-Performance Sensitivity

Part A: The Model

A linear regression model of the optimal executive compensation contract is used based on the intuition of the comparative static relationship between risk and pay-performance sensitivity. This linear functional form will adequately allow for estimation of the pay-performance sensitivity and for the effect of risk associated with variation of firm stock-market performance on this sensitivity.

A multiple regression model based on an approximation of the optimal executive compensation contract for executive i , at firm j , in period t , is expressed as follows⁶:

Executive compensation = f(firm performance, variance in market returns, firm size)

$$\omega_{ijt} = \beta_0 + \beta_1\pi_{jt} + \beta_2\sigma_{jt}^2\pi_{jt} + \beta_3\sigma_{jt}^2 + \delta_j(\text{firm size}) + \varepsilon_{it} \quad (4)$$

The optimal executive wage, ω_{ijt} , is regressed on return to shareholders (specified in percentage stock returns), π_{jt} , the interaction of stock return variance and firm performance, $\sigma_{jt}^2\pi_{jt}$, variance of stock returns for individual firms at monthly frequency, σ_{jt}^2 , a firm size effect using stockholder equity value proxy, δ_j , and a normally distributed error term. Refer to Table 1 to follow for variable definitions.

The pay-performance sensitivity, depicted by α_1 in the simple economic model of executive pay ($\omega = \alpha_0 + \alpha_1\pi$), is estimated by the marginal effect of firm performance on executive pay in the multiple regression model.

$$\alpha_1 = \frac{\partial \omega}{\partial \pi} = \frac{\partial \beta_1\pi + \beta_2\sigma^2\pi}{\partial \pi} = \frac{\partial (\beta_1 + \beta_2\sigma^2)\pi}{\partial \pi} = \beta_1 + \beta_2\sigma^2 \quad (5)$$

The pay-performance sensitivity for an executive with a nonrandom stock return variance, σ_{jt}^2 , is:

$$\alpha_1 = \beta_1 + \beta_2 \sigma_{jt}^2 \quad (6)$$

The full econometric model is estimated using Ordinary Least Squares. The point estimates for parameters β_1 and β_2 are examined for significance and sign relative to the intuition of agency theory. The pay-performance sensitivity ($\beta_1 + \beta_2 \sigma^2$), estimated from these results, is used to describe the magnitude of the coefficients and the economic significance of the estimated model. I use the model of pay-performance sensitivity to demonstrate the principal-agent assertion that the incentives work to align the interests of shareholders and executives. This theory is supported when the pay-performance sensitivity is greater than zero.

$$\beta_1 + \beta_2 \sigma^2 > 0 \quad (6)$$

A formal hypothesis test for this assertion is:

$$H_0: \beta_1 + \beta_2 \sigma^2 = 0$$

$$H_1: \beta_1 + \beta_2 \sigma^2 > 0$$

The proportion of sample observations for which there exists positive pay-performance sensitivity is determined by application of this inequality. Subsequently,

⁶ The multiple regression model used here is adapted from the model formulated by Aggarwal & Samwick (1999) with modifications made to the coefficient notation and the independent variables.

this model will be examined at different levels of firm return variance to determine the effect of risk on performance pay.

Part B: The Data

This study employs a cross-sectional data sample of executive compensation among the largest, publicly traded companies in the United States. The sample consists of 444 observations of executive compensation from a selection of 222 public companies. This cross-sectional data set is appropriate because it contains observations for CEO's and other top executives from firms across ten different industry groups. The compensation data is a selection published by *BusinessWeek* in conjunction with *Standard & Poor's Execucomp*, *Bloomberg Financial Markets* (April 2002) for firms with market values among the 500 largest for which 2001 compensation data is available⁷. This data set provides the following measurements: 1) executive total compensation (base salary, bonus and long-term compensation, which includes value of gains from stock options exercised), 2) annual change in pay-related wealth (base salary, short and long-term bonus, the value of restricted stock grants and the change in value of the executive's vested, unvested and exercised in-the-money stock options⁸ from the fiscal pay period) and 3) the respective company's total market return to shareholders including stock appreciation and dividend distributions (measured by the 2001 dollar

⁷ A sample of observations was taken from the BusinessWeek "Executive Compensation Scoreboard" (2002) of executives from firms for which all relevant financial data, including variance of stock returns and stockholders equity, was available. The original data set includes over 700 executive compensation observations.

⁸ "In-the money" stock options are reported on the balance sheet, and therefore included in the ExecuComp data set, as long as the stock price of the firm remains above the option's exercise price. If the stock price falls below the exercise price, the option is not reported. (Aggarwal 1999)

value of a stock investment plus dividends reinvested for 3 years, as a percentage return from the respective dollar value at the end of calendar year 1998). Data for the dollar variances in stock prices of the individual sample firms is calculated from stock prices posted at the online resource of Yahoo!Finance. The stock price⁹ variance for individual firms is calculated at a monthly frequency for the thirty-six month period preceding the end of fiscal year 2001. The annual stockholder equity values, also collected from Yahoo!Finance, are taken from the corporate financial statements of financial position for the years ending 1999, 2000, and 2001. I employ the supplementary stock return variance data to capture a measure of risk associated with firm performance. Only observations for which there is 36 consecutive months of return data are used to ensure consistency. Annual stockholder equity value for individual firms is included as a firm size proxy in the regression model. A variable controlling for firm size is included in the regression based on evidence that there exists a positive relationship between executive pay and firm size¹⁰. Top executives at large firms earn considerably greater compensation than those executives at smaller firms. The marginal productivity of the executives' supply of effort is thus greatly magnified by this relationship making it necessary to control for the factor of firm size in the model. It is also argued that firm size matters for this estimation of pay-performance sensitivity because it captures aspects of risk that fall beyond the scope of stock return variance. Stockholder equity is the most suitable measure for firm size in this analysis because of the accessibility of data and consistency of measure across the individual sample firms. A shortcoming to the use of this particular measure of firm size may be that it is a financial variable. The marginal

⁹ Stock price data includes dividends and other distributions.

product of effort may be better captured by a real measure of firm size such as number of employees, value of utilized assets, or total revenue.

V. Analysis and Results

Ordinary Least Squares regression is used to evaluate the sensitivity of executive total compensation to firm performance. The primary regression analysis utilizes three combined years of data to minimize the impact of single year fluctuations. The dependent variable is executive total compensation (measured in thousands of dollars). The explanatory variables include the 2001 dollar value of \$100 invested in each firm three years prior (as percentage market-return to shareholders), the interaction of market return and stock price variance (calculated at a monthly frequency for a thirty-six month period beginning January 1999), the stock price variance independent of the market return, and stockholder equity value as of fiscal year-end 2001 for an earnings-based firm size proxy. The independent variable for stock price variance, σ_{jt}^2 (not interacted with firm performance), is included in the regression to control for any relationship that may exist between compensation and variance in firm returns (Aggarwal and Samwick 1999) beyond the pay-performance sensitivity. Table 1 provides variable descriptions and Table 2 provides descriptive statistics for each of the variables included in the multiple regression.

¹⁰ See Garen (1994) for theory of firm pay relationship to firm size.

Table 1. Variable Descriptions

<i>Dependent Variable:</i>	
Executive Compensation	Total Compensation for the combined three years, 1999-2001, in thousands of dollars. Includes base salary, bonus, and value of gains on stock options exercised in the three-year period.
<i>Explanatory Variables:</i>	
Firm Performance	Stock market-value based firm performance is measured in 2001 dollar value, including appreciation and dividend distributions, of \$100 invested in the firm in the beginning of fiscal 1999. This value depicts a performance measure of percentage return to shareholders.
Performance x Variance	Firm performance measure in stock market return (stated above) multiplied by the variance in firm returns as described below. This variable represents impact of risk on pay-performance sensitivity.
Variance in firm returns	Variance in firm-specific stock prices at a monthly frequency for a thirty-six month period preceding the end of fiscal year 2001. Risk arising from stock price volatility.
Firm Size	Stock holder-equity from company statements of financial position at fiscal year end 2001.

Table 2. Descriptive Statistics

(n = 444)

Variable		Mean	Median	Maximum	Minimum
ω	Executive compensation	21,948.97	9,324.50	380,245.00	254.00
π	Firm performance	142.80	125.50	805.00	30.00
$\sigma^2\pi$	Performance x Variance	23,325.51	5,859.07	1,049,377.00	124.05
σ^2	Variance in firm returns	111.288	50.037	1345.355	0.697
δ	Firm size	6,168.07	2,801.95	152,071.00	-772.47*

* Minimum firm size is -772.47 based on negative value of stockholder-equity size proxy.

The second null hypothesis tests that there exists no effect of risk on the pay-performance relationship against the alternative that risk has a negative effect on the pay-performance relationship. The one-tailed p-value [$1.73\% = (0.0347/2)$] resulting from the OLS regression provides evidence that this null hypothesis can be rejected at the 10 percent significance level. This estimate is highly statistically significant.

Table 3 presents the Ordinary Least Square Regression estimates and the corresponding test statistics. White's Test leads to reject homoskedasticity in the sample. ($W = 49.83, P = 0.000$). Hence, White's robust standard errors are used in the econometric analyses¹¹.

Table 3. OLS Regression Results

Dependent Variable: Executive Total Compensation

Explanatory Variables		Coefficient	T – Statistic
π	Firm performance	54.365 (33.628)	1.617*
$\sigma^2\pi$	Performance x Variance	-0.072 (0.034)	-2.118**
σ^2	Variance in firm returns	36.172 (12.483)	2.898***
δ	Firm size	1.733 (0.348)	4.982***

Heteroskedasticity-robust standard errors are included in parentheses below the estimated coefficients. Compensation is measured in thousands of dollars and performance is measured as percentage of dollar value change in market return.

n = 444	$R^2 = 0.297$
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*Significant at the 10 percent level
 **Significant at the 5 percent level
 ***Significant at the 0.5 percent level

¹¹ White's test for heteroskedasticity: [conducted by Eviews]
 $H_0: \sigma_i^2$ consistent for all observations (homoskedasticity)
 $H_1: \sigma_i^2$ not consistent
 Tested at the 5 percent significant level
 White Statistic = $nR^2 = 49.83032$
 Chi-Square $\chi^2_{13, 0.95} = 22.362$

The estimated coefficient on firm performance, β_1 , and the estimated coefficient on the interaction of stock return variance and firm performance, β_2 , have signs that are consistent with the expectations of agency theory and the comparative static prediction described above. The estimated coefficient β_1 depicts a statistically significant positive relationship between executive total compensation and firm performance. The statistic for the estimated coefficient β_2 presents a negative relationship between variance in firm returns and the sensitivity of executive total compensation to firm performance. This particular statistic indicates a highly significant negative relationship between executive compensation and variance in firm returns interacted with firm performance. This negative relationship associated with variance in firm returns represents the negative effect of increased risk on the pay-performance sensitivity.

A formal hypothesis test for firm size is not necessary for the purpose of this examination. However, it is worthwhile to note that in this sample the relationship between firm size and executive pay is positive and significant. The coefficient estimator for firm size is statistically significant at the 0.5 percent significance level. This positive relationship between executive wage and firm size is in agreement with the hypotheses stated by Garen (1994). The stock return variance estimator independent of firm performance, σ_{jt}^2 , is not included the estimation of the pay-performance sensitivity. Nevertheless, it is interesting to point out that the coefficient on the estimator for σ_{jt}^2 , is positive and statistically significant and may be worth looking at in greater depth in future research.

$nR^2 = 49.83032 > 22.362 = \chi^2_{13, 0.95}$, therefore reject null hypothesis of homoskedasticity.

The results for the OLS regression provide strong statistical support for the principal-agent model. Given the cross-sectional nature of the sample and the narrow scope of explanatory variables included in the regression, this model provides substantial explanatory power for the relationship between firm performance and executive compensation, supported by an R^2 value of 0.297. Various exogenous factors not included in this analysis may have an effect on executive compensation. Such factors may include executive age, company tenure, geographic location, etc. In addition, an executive fixed effect variable was not included in this regression model. This variable is identified by Aggarwal and Samwick (1999) and may have provided additional control for executive or firm specific factors that may also influence the determination of incentive pay. Such factors may also include education or management experience. This inclusion of such factors is beyond the scope of this paper. Even so, the results of this empirical analysis are robust.

The magnitude of the coefficients and the economic significance of the results are presented by formulating the regression estimates for parameters β_1 and β_2 into the model for pay-performance sensitivity. At the mean variance, the pay-performance sensitivity ($\beta_1 + \beta_2\sigma^2$) is equal to 46.354. This estimation shows that for a firm with average variance (measured by the sample mean of variance) executive compensation increases \$46,354 for every percentage increase in market value of firm stock-return to shareholders. Compared to previous literature, this pay-performance sensitivity estimation is of economic significance.

Table 4. Estimation of Pay-Performance Sensitivity

Estimated Pay-Performance Sensitivity		
$\alpha_1 = (\beta_1 + \beta_2 \sigma^2)$ estimated at:		Estimated α_1
Mean Variance	($\sigma^2 = 111.2$)	46.354
Minimum Variance	($\sigma^2 = 0.697$)	54.314
1 st Quintile Variance	($\sigma^2 = 12.888$)	53.437
2 nd Quintile Variance	($\sigma^2 = 26.205$)	52.478
Median Variance	($\sigma^2 = 50.037$)	50.762
4 th Quintile Variance	($\sigma^2 = 108.027$)	46.587
5 th Quintile Variance	($\sigma^2 = 368.507$)	27.832
Maximum Variance	($\sigma^2 = 1345$)	- 42.473

It is evident that the estimated pay-performance sensitivity at the mean variance is skewed by the extreme values of the few highest stock return variances. Variances for respective quintiles represent median values.

The effect of risk on the relationship between executive compensation and firm performance can be illustrated with this comparative model for pay-performance sensitivity. The reported regression estimates establish a pay-performance sensitivity of 50.762 for a firm with median variance (best average measure for this sample). That is, a \$50,792 increase in executive pay per one percentage point increase in shareholder stock returns. An increase in variance in firm returns indicates an increase in risk associated with firm performance. The comparative static prediction derived from principal-agent theory and tested from this estimation asserts that an increase in risk causes a decrease the pay-performance sensitivity. The sample is sorted by stock return variance and divided into quintiles, as presented above, to display the magnitude of this effect. Pay-performance sensitivity decreases from median values of 53.437 to 27.832 between the 1st and 5th quintiles. This is a significant difference of \$25, 605 in incentive compensation for a percentage point increase in firm stock-market value. When the

maximum variance from the sample is substituted into the model, the pay-performance sensitivity decreases substantially to a value of -42.473 . This negative estimate supposes a \$42,473 decrease in executive compensation per percentage increase in market return. Does this signify a negative incentive payment? The level of risk associated with the maximum variance in firm stock returns in this sample is indicative of a loss in pay-performance sensitivity that outweighs the gain for the executive associated with the performance-based incentive payment. This shows that the pay-performance sensitivity decreases substantially with increased levels of risk. In the case of this sample, there exists a level of risk at which the pay-performance sensitivity falls below zero. Pay-performance sensitivity less than zero identifies that there no longer exists an alignment of interests between shareholders and executives. Table 4 shows the change in the pay-performance sensitivity when estimated at varying levels of risk. There is material distinction between the incentive reward suggested by the pay-performance sensitivities at the minimum and maximum variances in firm stock-prices in this sample. This variation shows the magnitude of my results and the economic significance of the estimated model. Pay-performance sensitivity offers the strongest alignment of executive pay to firm performance where there exists a minimum level of risk

The pay-performance sensitivity estimates lend significant support to the agency theory. Specifically, these estimates support the prediction that pay-for-performance will induce the executive to put forth effort towards increasing firm returns given an acceptable level of risk. The key point to this conjecture is the notion that there exists a level of acceptable risk. One way to illustrate the importance of an acceptable level of risk is to show the pay-performance effect at an unacceptable level of risk. As risk

increases, the pay-performance sensitivity decreases hence, decreasing the magnitude of the incentive to the executive. At some level of variance in firm returns, the loss in pay-for-performance corresponding to the increase in risk will outweigh the gain to the executive from the performance pay. At this level of variance there will be a lack of incentive for the executive to accept the risk of putting effort towards maximizing shareholder wealth. I apply this conjecture to my sample to determine the level of return variance at which the pay-performance sensitivity will no longer serve the predicted function of aligning increases in firm performance with an increase in executive pay. I arrange the model of pay-performance sensitivity to depict a relationship between the coefficient estimators and the measure of return variation that will provide an answer to this question:

$$\beta_1 + \beta_2\sigma^2 > 0 \longrightarrow \sigma^2 < -\beta_1/\beta_2$$

This inequality shows that the variance in firm stock returns must be less than the ratio of the negative of coefficient β_1 to coefficient β_2 (which is inherently negative as previously supported) in order for there to exist a positive pay-performance sensitivity estimation. The highest level of risk resulting in this sample for which there remains statistically positive pay-performance sensitivity is at a variance of 755.07. This result indicates that over 97 percent of the sample observations sustain a level of risk that results in positive pay-performance sensitivity, thus indicating a positive statistical relationship between firm performance and executive pay in the overwhelming majority of the sample.

The empirical investigation provides statistical support to the comparative static prediction that risk is a significant determinant of pay-performance sensitivity. To

provide confirmation of this prediction, I restrict the original multiple regression to determine the significance of omitting the factor of risk from the model. I set the coefficients β_2 and β_3 equal to zero, thus omitting the influence of variance in firm returns, σ^2 , from the estimation. I test the null hypothesis that the interaction of variance and performance is unrelated to executive compensation ($\beta_2 = 0$) and also that variance independent of firm performance is unrelated to executive compensation ($\beta_3 = 0$).

$$H_0 : \beta_2 = 0 \text{ and } \beta_3 = 0$$

$$H_1 : \beta_2 \neq 0 \text{ and /or } \beta_3 \neq 0$$

Tested at the 5 percent level of significance

$$\text{Restricted Model: } \omega = \beta_0 + \beta_1\pi + \beta_4\delta(\text{firm size}) + \varepsilon.$$

The null hypothesis is tested against the alternative that one or both of the relationships is not equal to zero. Regression results are presented below in Table 6. At a 5 percent level of statistical significance, the null hypothesis can be rejected (F statistic 4.241, P-value 0.015) providing evidence that there does exist a relationship between variance in firm returns and the sensitivity of executive pay to firm performance.

Table 5. OLS Regression Results (Model 2)

Dependent Variable: Executive Total Compensation

Explanatory Variables		Coefficient	T – Statistic
π	Firm performance	38.777 (19.908)	1.948*
δ	Firm size	1.729 (0.343)	5.044***

Heteroskedasticity-robust standard errors are included in parentheses below the estimated coefficients. Compensation is measured in thousands of dollars and performance is measured as percentage of dollar value change in market return.

n = 444	R ² = 0.286
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*Significant at the 5 percent level
***Significant at the 0.5 percent level

The resulting restricted regression coefficient results translate into an estimated pay-performance sensitivity of 38.777. That is, a \$38,777 increase in executive total compensation per percentage point increase in market return. This sensitivity is considerably smaller than the pay-for-performance depicted in from the original regression at the sample median variance (50.762). Thus, omitting the variable to control for variability in firm returns results in an estimated pay-performance sensitivity that is biased towards zero. This confirms the findings of Aggarwal and Samwick (1999).

In response to the results of this primary regression analysis, I employ comparative analysis to respond to a few particular issues concerning the structure of executive compensation contracts. First, criticism of pay-performance estimations similar to the methodology used in this study claims using equity-based performance measures to estimate pay-performance sensitivity is less effective than using earnings-based performance measures because of the indirect effect of market-wide stock-price fluctuations and the diminished sensitivity to firm-specific changes in value. To test this assertion a sensitivity regression analysis is conducted. The new regression model mirrors the original in all variable measures except for that of firm performance. The modified explanatory variable for firm performance is the change in dollar value of stockholder equity (measured in million dollars) from the financial position of individual firms over the same 1999 to 2001 sample period. The stockholder equity financial

position includes retained earnings, which are accounting based earnings held in the company for reinvestment in its operations. This particular value is utilized as an earnings based performance measure because it defines equity value for the shareholders base on accounting returns rather than simply using the sometimes less meaningful raw sales or revenue income values. If pay-for-performance incentive payments are a significant component of executive compensation, I expect both equity-based and earnings-based performance measures to be positively related to total compensation.

Table 6. OLS Regression Results (Model 3)

Dependent Variable: Executive Total Compensation

Explanatory Variables		Coefficient	T – Statistic
π	Firm performance	3.167 (2.187)	1.448*
$\sigma^2\pi$	Performance x Variance	-0.020 (0.014)	-1.441*
σ^2	Variance in firm returns	42.707 (15.396)	2.774**
δ	Firm size	1.427 (0.620)	2.302**

Heteroskedasticity-robust standard errors are included in parentheses below the estimated coefficients. Compensation is measured in thousands of dollars and performance is measured in dollar changes of firm specific stockholder equity values (in millions).

n = 444	$R^2 = 0.316$
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*Significant at the 10 percent level

**Significant at the 5 percent level

The results of the sensitivity analysis show that when earnings-based measures of firm performance are substituted for stock return measures in the regression model, the signs of the coefficients remain as predicted by theory. Positive pay-performance sensitivity exists that is decreasing in the risk associated with firm market performance. The explanatory power of the regression ($R^2 = 0.316$) is greater than the explanatory power of the original regression. Table 6 presents the corresponding test statistics. The

statistical significance of the coefficients (b_1 : one-tailed p-value 7.4% and b_2 : one-tailed p-value 7.5%) is not as strong as the evidence provided when using stock-based measures for firm performance. The magnitude of the estimated pay-performance sensitivity at the sample median variance ($\alpha_1 = 3.057$) is also less economically significant compared to the sensitivity estimated from the original regression. This pay-performance sensitivity, based on earning based performance measure, infers a \$3,057 increase in incentive based compensation per \$1,000,000 increase in company stockholder equity value. I speculate from this estimation that the relationship between the variables remains as predicted by theory, however earnings based performance measures provide more conservative results, less biased by market-wide fluctuation.

A particular objective set forth in the introduction to this study involves applying the empirical model to address concerns about the current position of pay-performance sensitivity. In the post-Enron economy of market instability and unprecedented levels of market risk, a commonly addressed issue of concern about pay-performance sensitivity is the exorbitant levels of pay-related wealth that is created by equity-based incentive payments. Thus, many public investors and corporate governance critics question the short-term effects of incentive compensation relative to the short-term changes in company value. This issue is empirically tested through a further modification to the original multiple regression. This variation of the optimal wage model applies the most current, 2001 annual change in executive pay-related wealth as the dependent variable. This measurement includes the gain or loss in value of the executive's vested and unvested in-the-money stock options in addition to the total compensation salary, bonus, and gains from exercised options over the 2001 single year period. The pay-related

wealth is then regressed on the change in shareholder equity value from fiscal year end 2000 to fiscal year end 2001, the stock return variance of stock dollar prices for the year 2000, and the same firm size proxy. The year 2000 stock return variance is utilized based on the speculation that the incentive payments in the year 2001 compensation packages are based on existing firm risk at the beginning of the 2001 fiscal year period. Thus, the most appropriate measure of risk is the previous year rather than current year variance in stock returns.

The estimation results of this particular analysis oppose the theoretical predictions with statistical significance. There exists a negative sensitivity between executive pay related wealth in 2001 and the annual measure of firm performance. Also, the coefficient on the interaction of stock-return variance and firm performance indicates a positive relationship between variance in firm returns and the sensitivity of executive pay related wealth to firm performance. Table 7 provides the corresponding test statistics.

Table 7. OLS Regression Results (Model 4)

Dependent Variable: Executive Pay-Related Wealth (2001)

Explanatory Variables		Coefficient	T – Statistic
π	Firm performance (2001)	-1.896 (1.388)	-1.365*
$\sigma^2\pi$	Performance x Variance	0.032 (0.019)	1.698**
σ^2	Variance in firm returns	-63.879 (26.608)	-2.401**
δ	Firm size	-0.243 (0.332)	-0.729

Heteroskedasticity-robust standard errors are included in parentheses below the estimated coefficients. Compensation is measured in thousands of dollars and performance is measured in dollar changes of firm specific stockholder equity values (in millions).

n = 444	R ² = 0.078
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*Significant at the 10 percent level

**Significant at the 5 percent level

The test statistics provide significant statistical evidence of an inverse relationship of equity based incentive compensation to firm performance over a single year period of declining stock values. [b₁: one-tailed p-value 0.086 and b₂: one tailed p-value 0.045]

This particular estimation of pay-performance sensitivity utilizes a measurement of incentive compensation that is more inclusive of stock option value. Although the magnitudes of the coefficient estimations are not economically significant, the results do provide evidence to support the concern that executives in fact continued to gain during fiscal year 2001 as investors lost value from their ownership interest in the firm. Many reasons for this relationship could be true. For one, is it the ability for companies to grant fixed price stock options without charging the expense against income? Or, is it the ability of the board of directors to compensate executives with additional options when the value of the company stock falls thus alleviating the loss through quantity of options?

From this comparative empirical investigation, it may be conjectured that although equity-based incentives may directly tie executive pay to company stock-price value, they offer great enough leverage that gains from accumulated pay-related wealth far exceed losses of a short-term windfall. Examination of these potential barriers to effective incentive compensation procedures may be an insightful area for future research. This comparative single year regression result provides evidence in support of pay-performance sensitivity as a long-term incentive option that falters over a volatile, short-term period.

VI. Conclusion :

This analysis provides compelling evidence to support a positive relationship between firm performance and executive pay over the three-year (1999-2001), long-term period. It is also statistically evident from this empirical examination that the pay-for-performance sensitivity is decreasing in the risk associated with variability of firm returns. Furthermore, the empirical models show that pay-performance sensitivities that do not condition on firm variance considerably underestimate the pay-performance sensitivities that do condition for this factor of risk. A comparative analysis portrays that the statistical and economical significance of pay-performance sensitivity is greatest when stock market measures, rather than earnings-based measures of firm performance are present. This can be recognized as a result of the vast use of stock and stock option rewards within the executive compensation contract. Lastly, the 2001 single-year analysis of the empirical model, in terms of the relationship between executive pay-related wealth and firm performance, provides evidence to support the motivation for incentive compensation reform. In a bull-market economy, the use of stock options provides great incentive for top executives to manage companies for short-term price gains. This particular analysis shows however that the pay-performance sensitivity does not however dictate the same optimal-incentive pay-performance relationship when market returns fall. Therefore, this examination concludes that performance based incentive compensation should correspond to long-term performance measures and company goals.

The evidence from this study provides support for the existence of pay-performance sensitivity but it does not specifically determine how well the incentives actually work. What many are wondering is if the incentives work too well to produce pay-related wealth over time and if this is the reason for dishonest, rent-seeking executive behavior? This speculation introduces issues of fairness, efficiency, and income distribution that should even interest those not directly invested in the ownership of publicly traded corporations. This would be an interesting topic for investigation.

The results of this study support the findings of Aggarwal and Samwick (1999) that principal-agent considerations are incorporated into executive compensation contracts. I suggest that in future research more work should be done to test the significance of pay-performance sensitivities amongst particular industry groups in a relative performance evaluation framework and in comparison to international corporate markets.

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