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## The Relationship Between Risk, Performance-Based Pay, and Organizational Performance

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## Abstract

In this study, we argue that much of the recent agency-based research on performance based pay virtually omits the role of risk. This compensation research has predominantly taken the positive perspective and focused on the incentive properties of performance-based pay, thereby overlooking the important role that risk plays in normative formulations of agency theory (Holmstrom, 1979; Eisenhardt, 1989; Jensen & Meckling; 1976). Building on previous research, such as Beatty and Zajac (1994), we re-introduce risk by investigating its effects on the formation and outcomes of performance-based pay contracts. Specifically, our study examines both the main effects of risk on the structure of compensation contracts and the joint effects of risk and performance-based pay on firm performance. This study is based on data of incumbent managers from 356 companies over the period 1981 to 1988. Financial performance and market data were drawn from the CRSP and COMPUSTAT.

## Keywords

risk, performance, pay, compensation, firm, manager, companies, research, employee

## Comments

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## WORKING PAPER SERIES

# The Relationship Between Risk, Performance-Based Pay, and Organizational Performance

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George T. Milkovich

Working Paper 95-01



**THE RELATIONSHIP BETWEEN RISK, PERFORMANCE-BASED PAY, AND  
ORGANIZATIONAL PERFORMANCE**

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This paper has not undergone formal review or approval of the faculty of the ILR School. It is intended to make results of research, conferences, and projects available to others interested in human resource management in preliminary form to encourage discussion and suggestions.

## **THE RELATIONSHIP BETWEEN RISK, PERFORMANCE-BASED PAY, AND ORGANIZATIONAL PERFORMANCE**

In this study, we argue that much of the recent agency-based research on performance-based pay virtually omits the role of risk. This compensation research has predominantly taken the positive perspective and focused on the incentive properties of performance-based pay, thereby overlooking the important role that risk plays in normative formulations of agency theory (Holmstrom, 1979; Eisenhardt, 1989; Jensen & Meckling; 1976). Building on previous research, such as Beatty and Zajac (1994), we re-introduce risk by investigating its effects on the formation and outcomes of performance-based pay contracts. Specifically, our study examines both the main effects of risk on the structure of compensation contracts and the joint effects of risk and performance-based pay on firm performance. This study is based on data of incumbent managers from 356 companies over the period 1981 to 1988. Financial performance and market data were drawn from the CRSP and COMPUSTAT.

## **THE RELATIONSHIP BETWEEN RISK, PERFORMANCE-BASED PAY, AND ORGANIZATIONAL PERFORMANCE**

In recent years, agency theory has emerged as the principal theory guiding organizational research on the pay-performance relationship. The agency literature has been described as bifurcated, taking either a positive or normative perspective (Eisenhardt, 1989; Jensen, 1983). Classic definitions of agency theory, what Jensen (1983) and Eisenhardt (1989) call the normative approach, posit that the choice of an optimal compensation system is contingent on both the need to direct employee behaviors and the need to mitigate the effects of risk (H61mstrom, 1979; Gibbons, 1992; Jensen & Meckling; 1976). Recent agency-based research, based on the positive perspective, focuses on the performance-inducing effects of performance-based pay, thereby de-emphasizing the pivotal role risk plays in normative models (e.g., Abowd, 1990; Gerhart & Milkovich, 1990; Jensen & Murphy, 1990). These studies investigate the efficacy of performance-based pay contracts in a wide variety of organizational contexts (Eisenhardt, 1988; Jensen, & Murphy, 1990; Leonard, 1990; Tosi & Gomez-Mejia, 1989). Applications of the strategic-contingent model (Gomez-Mejia & Balkin, 1992) are also often framed in agency terms, modeling firm performance as resulting from the "fit" between the environment, business strategy, and employee compensation. Both agency and strategic--contingent models assert that compensation is a key, if not primary, mechanism for aligning employee behaviors with organizational and shareholder objectives. A central proposition of these models is that directing employee contributions toward organizational goals requires aligning the structure of compensation contracts with these important business objectives.

The positive focus has greatly increased our understanding of the use and effects of performance-based pay, but not the role of risk (e.g., Deckop, 1988; Jensen & Murphy, 1990). Recently, Beatty and Zajac (1994) re-introduced the importance of risk in agency relationships and investigated its effects on compensation contracts. They found that the use of performance-based pay in executive compensation contracts is influenced by risk considerations. Although the purpose of their investigation was not to investigate the ultimate effects of risk on firm outcomes, Beatty and Zajac (1994) suggest their results affirm theoretical arguments about its importance in the pay-performance relation. Other agency-based research, much of it concerned with organization strategy, has found that risk influences compensation-related outcomes (Amihud & Lev, 1981; Hoskisson, Hitt, & Hill, 1993; Hoskisson & Turk, 1990). By including the influence of risk on the pay-performance relationship, our study attempts to bridge the gap between positive-based compensation research and the more normative agency literature. Drawing upon formative work in employment contracts and agency theory

(Eisenhardt, 1989; Jensen, 1983; Jensen & Meckling, 1976; Simon, 1951) we investigate the effects of risk on the form and outcomes of compensation contracts. Our study extends the work of Beatty and Zajac (1994) by examining whether the degree of risk organizations face moderates the performance-based pay organizational performance relationship. Our investigation includes both the effects of risk on the structure of compensation arrangements and the joint effects of risk and performance-based pay on firm performance.

### **INCENTIVE COMPENSATION AND ORGANIZATIONAL PERFORMANCE**

Most agency-based, pay-performance research assumes what Eisenhardt (1989) and Jensen (1983) call the positive model which emphasizes the principal's choice of behavioral (i.e., use of a static wage) versus outcome-based (i.e., use of incentive pay) compensation contracts. This framework specifies that optimal contracting schemes are concerned with the efficient use of salary, which is set and invariant, and performance-based pay, which varies positively with outcomes. Consequently, the positive model focuses on factors such as information asymmetry, task programmability, and goal conflict that influence the form of the compensation systems (Eisenhardt, 1989). According to the positive model, performance-based pay can ameliorate the agent's tendency toward opportunistic behaviors and direct agent's actions toward the principal's objectives.

Research based on the positive model provides evidence supporting the efficacy of incentive pay for achieving organizational objectives. Jensen and Murphy (1990) "...interpret higher b's [slope coefficients denoting amount of agent's pay that is dependent upon firm outcomes] as indicating a closer alignment of interests between the CEO [agent] and his shareholders [principals] (p. 227)." Tosi and Gomez-Mejia (1989) state that "[b]oth theory and research have led to the conclusion that agency costs are minimized when CEO compensation is related to firm performance or other types of information regarding actions taken by executives (p.173)." They cite several theoretical and empirical studies that support the contention that outcome-based contracts are superior to behavior-based contracts for executive- and managerial level jobs. Results of Tosi and Gomez-Mejia (1989) indicate that principals prefer performance-based pay to direct manager's actions.

Abowd (1990) also provides evidence that the performance-based pay-organizational performance relationship is positive. Based on agency theory, he predicts a positive relationship between the degree of performance sensitivity in the pay plan and corporate returns in 225 companies. Results of analyzing over 99,000 individual executive pay observations indicate that the level of performance sensitivity in managerial pay is positively related to total shareholder return and to a measure of gross economic return. Milkovich, Gerhart, and Hannon (1991) use

an agency theory perspective to predict that the strategic use of contingent pay would focus manager's decisions on important firm outcomes. They study 110 companies using R&D intensity as a proxy for firm strategy and found that the level of contingency in compensation was significantly related to the degree of R&D intensity. Milkovich, et al. (1991) conclude that R&D intensive firms relied on incentive pay to align employee actions with critical organizational performance objectives. Leonard (1990) investigates the incentive pay solution to the agency problem in 439 companies over the period 1981-1985. His results indicate that firms implementing bonus systems have significantly higher performance (as measured by ROE) than firms without bonus systems.

Gerhart and Milkovich (1990) report that annual bonuses were positively related to return on assets using compensation survey data from 124 companies. In their sample, a ten percent increase in bonus size is associated with a 1.5% increase in ROA. Similarly, an increase of 10% in the proportion of managers eligible for long-term incentives is associated with a .20% increase in ROA. Other research in compensation focuses on the relation between managerial pay and firm performance (for reviews see Gerhart & Milkovich, 1992; *Industrial & Labor Relations Review*, 1990, special issue 43:3). In toto, this literature strongly suggests that performance-contingent compensation can have a direct impact on guiding employee behavior, especially that of managers, toward organization objectives. However, the results are not unequivocal.

Crystal in *In Search of Excess* (1991) and Kohn in *Punished by Rewards* (1993) contend that pay-for-performance contracts are often ineffective and may have deleterious effects. Walsh and Seward (1990) note that performance-based pay may cause managers to adopt a host of "entrenching" practices (e.g., compromise performance measures, neutralize control mechanisms, adopt deleterious corporate strategies) that could have detrimental effects of organizational performance. Furthermore, bonus plans may be easily manipulated or "gamed" by managers and offer little direction into how high organizational performance is to be achieved (Walsh & Seward, 1990; Nalbantian, 1987). Dorsey (1994) describes approaches utilized by Xerox sales employees to finesse the risk in corporate sales incentive plans, including collusion with customers. Quinn and Rivoli (1993) assert that the riskiness of performance-based pay causes employees to assume a risk averse posture, lowering their propensity to be innovative. The premise of this viewpoint is that since "...the risk associated with manager's income is closely related to the firm's risk (Amihud & Lev, 1987:606)," higher organizational risk may induce managerial behavior that works against organizational effectiveness. Amihud and Lev (1981) report that managers may use conglomerate mergers simply to reduce employment and



earnings risk. While conglomerate mergers may reduce manager's risk, they are often associated with negative shareholder returns and, therefore, may work against the principal's welfare. Hoskisson, Hitt, Turk and Tyler (1989) assert that bonuses expose managers to risks beyond their control and may induce risk averse behavior. This contention was supported by Hoskisson, Hitt, and Hill (1993) who find that outcome-based performance measures (e.g., financial controls) were associated with lower investments in research and development, even when such decisions worked against the organization's interests.

The influence of risk on the form and outcomes of the employment contract is offered in classic agency formulations as an explanation for these disparate viewpoints. The trade-off between incentives and risk-sharing effects is a fundamental premise of agency theory (Eisenhardt, 1989; Jensen, 1983; Stiglitz, 1987). The premise is that, the use of incentives to align agent's behavior and reduce principal's risk also increase agent's risk, leaving the possibility for negative consequences (Eisenhardt, 1989; Stiglitz, 1987). This balance of incentive against risk-sharing is the fulcrum of agency theory: predictions about the effects of performance-based pay can be accurately understood only by including the effects of risk (Scholes, 1991; Stiglitz, 1987). Since the agency model expressly includes risk as a force mitigating both the use and efficacy of incentive compensation, the effects of risk warrant inclusion in agency-based compensation research. Recently, Beatty and Zajac (1994) found that organizational risk is associated with the use of stock options among companies engaging in initial public offerings (IPOs). IPOs with higher risk levels tend to use stock options to a lesser degree than lower-risk IPOs. The purpose of their study was not to relate the risk-compensation relationship to firm performance, but they suggest this association is important. If risk does influence the use and efficacy of performance-based pay, such effects might help explain some of the disparate results in pay-performance research. The sample used by Beatty and Zajac (194) was unique; newly emerging publicly-held companies. Since the vast majority of agency-based compensation research has been conducted on samples of large organizations, it would be fruitful to investigate the risk-performance-based compensation relationship among such a sample. We take up these and related issues below.

### **BUSINESS RISK, COMPENSATION DECISIONS AND ORGANIZATIONAL PERFORMANCE**

According to the normative agency perspective, the crux of the risk-return relationship lies in the degree to which managerial decisions are directed toward attainment of organizational performance objectives without inducing negative behaviors. The risk level of the firm is important because it influences the form and structure of the obligations and returns in

the employment contract. Higher risk imposes greater uncertainty on both parties, changing the nature of acceptable contract provisions-most notably compensation decisions.

Organizational strategy researchers have demonstrated that business risk influences organizational strategies and performance (Bowman, 1982, 1984; Aaker & Jacobson, 1987; Amit, & Livnat, 1988; Fiegenbaum & Thomas, 1988). Although this research is somewhat equivocal on the nature of this relationship, Miller and Bromiley (1990) provide evidence that different dimensions of business risk have different effects on organizational performance. In general, higher risk organizations seem to have poorer performance (Bowman, 1982, 1984; Miller & Bromiley, 1990). Miller and Bromiley's (1990) work suggests that agency's reliance on a general definition of risk might be incomplete. Incorporating different dimensions of business risk with agency theory could allow for a more fine-grained examination of the risk-incentive pay organizational performance relationship and may shed more light on conditions conducive to the use of performance-based pay.

According to Miller and Bromiley (1990), business risk can be grouped into three categories: income stream, strategic or financial, and stock return risk. Income stream risk relates to operational inefficiencies and is measured through variations in cash flow and accounting returns. As the variability in an organization's cash flows increase, so does the likelihood that the organization will default on its financial commitments. Uncertain cash flows also inhibit strategic activities, making it more difficult to change operations and resource allocations. This could have direct repercussions for many organization functions since lack of adequate resources may result in further losses, poor performance, or even failure.

Miller and Bromiley (1990) define strategic risk as the hazard of bankruptcy measured in terms of a firm's investments in capital, investments in research and development, or use of financial leverage. Although these investments are often associated with growth ventures, for all firms they have the effect of increasing fixed costs and potentially increasing profit variability. Higher investments in capital create the opportunity for capital obsolescence. External technological advances make achieving a return on previous capital expenditures more difficult. Under conditions of capital obsolescence, a firm could be constrained from reallocating the resources required to make necessary adjustments, which might then have deleterious effect on its profits.

Stock market risk measures variations in the price of a firm's common stock in relation to general market indices. Systematic risk, or beta, is the amount of price variation in an organization's shares that can be explained by changes in the stock market in general. The

extent to which changes in a firm's share price are reflected by swings in the equity market indicates the degree to which firm returns are more susceptible to external forces.

Agency theory asserts these dimensions of risk should influence the principal's choice of compensation contracts. Under a riskless scenario, the principal's choice of compensation plan is straightforward. If agent's inputs can be *a priori* specified and observed (e.g., low information asymmetry, high task programmability; Eisenhardt, 1989; Nalbantian, 1987), a wage-based system is feasible and preferred because payments are made only when required inputs are observed. However, where the principal does not know what actions the agent *should* take or what actions the agent does take (e.g., high information asymmetry, low task programmability; Eisenhardt, 1989), agency predicts principals will use outcome-oriented contracts with performance-based pay (Govindarajan & Fisher, 1990; Jensen & Murphy, 1990). If the principal has less than perfect information or information that is varied, the principal will be less able to accurately determine what agent actions will be necessary. Here, the principal must leave the choice of action to the agent which creates the possibility for shirking and moral hazard; the agent might not exert effort that advances the principal's objectives (Eisenhardt, 1989). Likewise, if the principal is unable to observe whether or not the employee engages in required behaviors, there is an increased risk of paying without receiving benefit. Neither of these situations is rectified if pay is not contingent upon performance. Holding external wage opportunities constant, if only static pay or salary is used, the agent has less incentive to act favorably on behalf of the principal; the agent's incentive is only to maintain employment (Amihud & Lev, 1981). Therefore, performance-contingent pay, which is conditional on achieving principal's objectives, must be used to align the interests (and therefore the actions) of the agent with those of the principal (Govindarajan and Fisher, 1989). Hence, as organizations face greater uncertainty (i.e., greater risk), they are more likely to use variable pay to control costs and ensure that employees' behaviors are aligned with organizational goals (Gomez-Mejia & Balkin, 1992; Govindarajan & Fisher, 1990).

For the principal, greater variability in the organization's income flow signifies greater risk. Uncertain income flows create uncertainty about meeting competitive conditions and financial obligations, including the compensation component of employment contracts. Since compensation costs vary considerably among industries, anywhere from 10 percent to 90 percent of total operating costs (Milkovich and Newman, 1993), positing a relationship between compensation decisions and income stream risk seems plausible. While the ability to attract and retain talent might limit a firm's ability to adjust total compensation to employees (Gerhart and Milkovich, 1990), it may be advantageous to change the forms of pay. In effect, the organization

creates an employment contract that shares some of the risk and returns with employees through a variable pay scheme tied to organization performance (Baker, Jensen & Murphy; 1988; Gibbons, 1992; Gomez-Mejia & Balkin, 1992; Jensen & Smith, 1990).

Likewise, greater financial or strategic risk (e.g., larger investments in capital, Miller & Bromiley, 1990) affect the principal's ability to meet financial obligations and, consequently, increase risk. Greater capital intensity may increase fixed costs. If economic conditions become unfavorable, the principal's financial condition would probably be negatively affected. Higher investments in capital are likely to lead to constraints on investments in human resources (Ehrenberg & Smith, 1991). This tightens compensation budgets and may induce organizations to design alternative pay policies. Since profits are more volatile, principals might prefer to make a portion of employee pay contingent upon the organization's performance. Here again, greater use of contingent pay might provide increased flexibility assisting the firm through difficult financial situations.

Finally, variability in shareholder returns should also influence compensation decisions. Since the major responsibility of managers is to increase shareholder wealth (Fama & Jensen, 1983), principals want to induce manager's to take actions that positively influence organizational value. In financial markets, investors desire to maximize systematic risk or beta (Black, Jensen, & Scholes, 1972; Jacob, 1971; Miller & Scholes, 1972). Therefore, principal's should find it advantageous to have the agent's pay vary positively with systematic market risk. Such positive variation will direct agent's effort toward those activities that maximize the principal's returns.

Based on the foregoing discussion, we derived four propositions.

**Proposition 1:** Organizations facing higher business risk will exhibit an increased emphasis on variable compensation compared to organizations facing lower business risk. That is,

$$\text{Variability of Compensation} = y_{jk} = \mathbf{a} + \mathbf{b}_i \mathbf{C}_{ijk} + \mathbf{g} \mathbf{Z}_j + \mathbf{e}_{jk} \quad [1]$$

where,

$y_{jk}$  = measure of the variability of pay for incumbent  $k$  in firm  $j$

$\mathbf{C}_{ijk}$  = a matrix of firm and individual control variables

$\mathbf{Z}_j$  = an estimate of the firm's business risk level

$\alpha$ ,  $\beta$ , and  $\gamma$  are coefficient vectors and,

$\mathbf{e}_{jk}$  = an error term that includes unmeasured causes of the dependent variable.

Conlon and Parks (1988) and Eisenhardt (1989) both use agency and compensating wage differential theories to conclude that agents under conditions of higher risk will require some premium to be paid for accepting greater risk. This premium will come in the form of

higher total and base pay. Higher base pay serves as insurance against a steeper pay-for-performance slope; higher total pay creates a positive pay-at-risk-pay return relationship. Research on the determinants of risk behavior also suggests that individuals will agree to greater levels of risk or outcome uncertainty as the potential pay off increases (Sitkin & Pablo, 1992). Therefore, individuals will be willing to exchange some pay security only if there is the potential for greater pay. Following this line of reasoning, as the level of business risk increases, the differential (risk premium) should also increase.

**Proposition 2:** Relatively higher business risk will be associated with relatively higher total compensation levels. Or,

$$\text{Total Pay} = y'_{jk} = \mathbf{a} + \mathbf{b}_j \mathbf{C}_{ijk} + \mathbf{g} \mathbf{Z}_j + \mathbf{e}_{jk} \quad [2]$$

**Proposition 3:** Relatively higher business risk will be associated with relatively higher base compensation levels. Or,

$$\text{Base Pay} = y''_{jk} = \mathbf{a} + \mathbf{b}_j \mathbf{C}_{ijk} + \mathbf{g} \mathbf{Z}_j + \mathbf{e}_{jk} \quad [3]$$

where,  $y'_{jk}$  = total pay for incumbent  $k$  in firm  $j$ , and

$y''_{jk}$  = base pay for incumbent  $k$  in firm  $j$

$\mathbf{C}_{ijk}$  = a matrix of firm and individual control variables

$\mathbf{Z}_j$  = an estimate of the firm's business risk level

$\alpha$ ,  $\beta$ , and  $\gamma$  are coefficient vectors and,

$\mathbf{e}_{jk}$  = an error term that includes unmeasured causes of the dependent variable.

Finally, when agency theory conditions are met, organization performance will improve. In a high risk situation, variable pay aligns the agent's actions with the objectives of the principal. This alignment achieves a match between the strategy of the organization (i.e., risky) and the compensation system offered to its managers (i.e., variable). Therefore, as the agency relationship moves toward optimization, superior organization performance should follow. Equally, the capacity to vary costs allows organizations to commit resources strategically, thereby maintaining a competitive advantage. And finally, when manager's pay is positively associated with systematic risk which maximizes shareholder value, higher organizational performance should follow. For high risk firms, the relationship between use of variable pay and performance can be expressed as follows:

**Proposition 4:** A relatively greater emphasis on variable pay by firms facing higher business risk will result in superior performance compared to high risk firms that have a lesser emphasis on variable pay. Or,

$$\text{Firm Performance}_t = y_{j,t} = \mathbf{a} + \mathbf{b}_j \mathbf{C}_{ij,t} + \mathbf{g} \mathbf{Z}_{j,t-1} + \mathbf{d} \mathbf{B}_{j,t-1} + \mathbf{I} V_{j,t-1} + \mathbf{e}_{j,t} \quad [4]$$

where,  $y_{j,t}$  = variable measuring a firm's annual performance at time  $t$

$C_{ij, t}$  = a matrix of firm control variables at time  $t$

$Z_{j, t-1}$  = a measure of firm risk at time  $t-1$

$B_{j, t-1}$  = an aggregate measure of a firm's base pay policy at time  $t-1$

$V_{j, t-1}$  = an aggregate measure of a firm's variable compensation policy at time  $t-1$

$\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$ , and  $\lambda$  are coefficient vectors and,

$e_{j, t}$  = an error term that includes unmeasured causes of performance at time  $t$ .

## METHODS AND ESTIMATION

### Measures of Business Risk

Three categories of organizational risk were utilized in our study, income stream risk, strategic risk, and systematic stock market risk. These measures of risk were drawn from previous strategy literature and have been used extensively in risk related research (Fiegenbaum & Thomas, 1988; Miller & Bromiley, 1990; Modigliani & Pogue, 1993).

Return on assets (ROA) is a common measure of organizational performance and its scaled and unscaled variance has been used as a measure of risk (Miller & Bromiley, 1990). We used a historical proxy of risk, measuring variance in ROA by taking the standard deviation of the previous five years before tax return on assets as our *ex post* income stream risk measure. Ruefli and Wiggins (1994) note that using mean-variance measures of risk and return leads to spurious correlations. To avoid this problem, we did not use the mean ROA as a performance measure (see measures of firm performance below).

Aaker and Jacobson (1987) used a measure of systematic stock market risk that controlled for a risk-free rate of return. We calculated a similar measure of systematic stock market risk or beta following the Capital Asset Pricing Model (CAPM; Modigliani & Pogue, 1993):

$$(\text{Stock return}_{jt} - \text{risk free return}_t) = \alpha + \beta_j (\text{Market portfolio}_t - \text{risk free return}_t) + \varepsilon_{jt} \quad [5]$$

where the risk free return was the U.S. government Treasury bill rate at time  $t$ . The stock price at time  $t$  was the month-end close or the average of the month-end bid and ask price. We used a value weighted market portfolio similar to the S&P 500 as our market index. A separate beta was calculated for each year.

Strategic risk was measured by capital intensity which is the ratio of annual total assets to annual sales (Miller and Bromiley, 1990).

In the analyses of the pay-risk-organizational performance relationship we used these measures from time  $t-1$  in regressions where the dependent variable was organizational performance at time  $t$ . We assumed that the effects of risk were not immediate and would manifest themselves sometime during the intervening year. A one-year lag is common in other

compensation-organizational performance research (Abowd, 1990; Gerhart & Milkovich, 1990; Jensen & Murphy, 1990).

### Contingent Compensation Measures

Variable or contingent pay refers to that portion of pay that is dependent upon performance (McAdams & Hawk, 1994; Conference Board, 1993; Milkovich and Newman, 1993). Although variable pay includes a variety of forms that are not added into base, bonuses are among the most common (McAdams & Hawk, 1994; Hewitt, 1993). Bonuses are likely to be contingent upon current performance and, thus, are likely to reflect the uncertainty facing organizations. Our measure of variable pay was based on the ratio of bonus-to-base pay derived by dividing the natural log of annual bonus by the natural log of annual base for each incumbent surveyed. Base pay was measured by the natural log of annual base pay; total pay was the natural log of annual base pay plus annual bonus pay.

To control for human capital factors we used regression residuals in our risk and performance analyses. These regressions controlled for age, job level, and organizational tenure. The residuals from Equation 6 represent the amount of the particular pay characteristic (e.g., base pay, variable pay) that remains unexplained after controlling for human capital factors. We computed the following regression for all executives (j) in all firms (k).

$$\text{Pay Characteristic}_{jk} = b_0 + b_1 \text{Age}_{jk} + b_2 \text{Job Level}_{jk} + b_3 \text{Firm Tenure}_{jk} + e_{jk} \quad [6]$$

The remaining pay unexplained by age, job level, and firm tenure, the  $e_{jk}$  from Equation 6, served as our pay proxies in the remaining regression analyses.

We specified two different classes of compensation measures depending on the level of analysis. Since agency theory predictions are framed in terms of contracts with single agents and, therefore, involve individual-level pay, we used pay data for individual executives in Equations 1 through 3. A total of 81,950 individual executive compensation observations were used in these regressions. Our investigation of the firm performance - compensation relationship involved firm-level outcomes. Therefore, we computed a proxy of firm compensation policies by using the average residual of all executive's pay reported for each firm in a single year. The firm-average of the residuals in Equation 6 was used as a proxy for firm's compensation decisions. Data from 356 companies were available for these analyses.

### Firm Performance

Two measures of organization performance are commonly used in research on risk and variable compensation: ROI and total shareholder return (Abowd, 1990; Miller and Bromiley, 1990; Jensen & Smith, 1990; Ehrenberg and Milkovich, 1990). We followed this convention and included both as measures of firm returns.

In all organizational performance analyses we controlled for previous firm performance by using the average firm ROI over the previous five years. Due to data constraints, we were unable to obtain a similar measure for total shareholder return.

### **Control Variables**

Firm size has been related to both pay level and the use of variable compensation (Gerhart & Milkovich, 1990; Kroll, Simmons, & Wright, 1990). However, Gerhart and Milkovich (1990) showed that virtually all of the firm-level size effects on variable pay can be accounted for through a fixed-effects model. Such a model includes an intercept for each firm thereby controlling for factors such as size and past performance. To compare a fixed-effects with the traditional variables-in-regression model, we ran separate regressions that included controls for size. We used annual sales, total assets, shareholder equity, and number of employees as controls for firm size. Due to the higher degree of correlation among the firm control variables, we used principal components factors derived from an analysis of all control variables except the industry code indicators (Johnson & Wichern, 1992). The difference in variance explained between the models was negligible. Therefore, we only present results for the fixed-effects model due to other considerations detailed below. Finally, since Miller and Bromiley (1990) note that the effect of strategic risk varied across industries and since Gerhart & Milkovich (1990) showed industry effects on compensation policies related to pay level and variability, we include single digit SIC codes as controls for industry effects.

In the firm performance analyses we also ran a fixed-effects model, comparing it to a model that controlled for past firm performance. Results were different across the models and we present both sets in the sections below.

### **Data Sources**

We combined three archival data sources for this study. The managerial compensation data was drawn from Cornell's Center for Advanced Human Resource Studies (CAHRS) compensation data base (described in Abowd, 1990 and Gerhart & Milkovich, 1990). Data for 356 companies was used over the period 1981 to 1988. Each organization was asked to report data on at least 75 incumbents. The job families included in the database cover a wide range of occupations and include profit center heads, manufacturing, marketing, finance, research and development, engineering, and so on. A total of 81,950 individual executive pay observations were used in the analyses.

Data for the systematic stock market risk were taken from the Center for Research on Security Prices data base (CRSP). The CRSP, compiled at the University of Chicago, tracks and records stock market price and index information for all publicly traded stocks in the U.S.



Accounting and financial data were drawn from COMPUSTAT data files (Standard & Poor's, 1992).

### **Statistical Models**

Since the data consisted of pooled cross-section-time series with multiple observations on each firm, we controlled for serial correlation in the data. We estimated general linear models controlling for case and cross-section (i.e., time period) effects. Although utilization of these controls might reduce the variance in dependent variables left to be explained by covariates of interest, we opted for the more rigorous method recognizing the possibility of constrained values in the resulting coefficients. In addition to concerns about serial correlation, equations testing the relationship of risk, compensation decisions, and firm performance included a lagged endogenous variable and, therefore, have the potential for autoregressive effects. We used an average of the past five years return on equity as our performance measure in a general linear model with fixed-effects. We then correlated the time-series residuals for each company. No significant autoregressive effects appeared.

## **RESULTS**

Descriptive statistics and a correlation matrix are presented in Table 1. The original firm size variables (assets, profits, sales, profits, and number of employees) are shown rather than the principle components. Moderate correlations between the risk measures were found. Income stream risk (deviation in ROA) is weakly and negatively correlated with strategic risk ( $r = -.07$ ), but positively correlated with systematic ( $r = .03$ ) stock market risk, results consistent with Miller and Bromiley (1990). Capital intensity is weakly correlated with stock market risk ( $r$  with  $\beta = .02$ ), which is inconsistent with Miller and Bromiley (1990). However, the magnitudes of most of these correlations are small.

TABLE 1

Descriptive statistics and correlation matrix  
(probability that 1= 0 <.05 unless otherwise noted)

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Base salary <sup>a</sup>	11.34	.50														
2. Bonus pay <sup>a</sup>	9.74	1.10	.79													
3. Total pay <sup>a</sup>	21.08	1.53	.90	.97												
4. Bonus-to-base ratio <sup>a</sup>	.85	.07	.52	.94	.85											
5. ROI	.11	.21	.06*	.73	.05	.10										
6. 5-year average ROI	.14	.73	.01	.10	.05	.13	.24									
7. Total shareholder return	.18	.29	-.04	-.02	-.02	-.002*	.20	-.05								
8. Beta	.01	.04	.03	.03	.03	.03	-.003*	-.08	-.07							
9. Capital intensity	.87	.37	.16	.08	.11	.02	-.07	-.06	-.09	.02						
10. SD of ROA	.03	.03	-.007	-.03	-.02	-.03	-.06	-.17	-.07	.03	-.07					
11. Assets <sup>b</sup>	384.37	662.30	.26	.18	.22	.11	.02	.06	-.007*	-.02	.25	-.02				
12. Number of employees <sup>c</sup>	37.50	41.19	.21	.23	.23	.20	.08	.09	.04	-.02	.009	-.14	.59			
13. Profits <sup>b</sup>	21.40	45.60	.22	.18	.20	.13	.10	.23	.00*	-.01	.10	.10	.82	.45		
14. Sales <sup>b</sup>	446.24	780.20	.22	.17	.20	.11	.04	.09	.02	-.03	-.006*	.009	.92	.56	.86	
15. Equity <sup>b</sup>	153.24	272.04	.25	.17	.21	.10	.02	.09	-.004*	-.02	.19	-.00*	.93	.51	.90	.93

- $p > .05$  <sup>a</sup>Data was measured as the natural log <sup>b</sup>Data was measured in \$millions <sup>c</sup>Data was measured in 1,000s

These data are from large companies and relatively high level managers. Average sales were \$4.46 billion and average assets of \$3.84 billion. The average number of employees was 37,498, average base salary was \$84,120 with an average bonus of \$16,983. The average bonus-to-base ratio was 20% with a minimum of zero and a maximum of 115%.

### **Risk and Pay Level**

The results present rather dramatic evidence which calls into question the premises of positive-based agency theory. While decisions about the level of pay (i.e., base and total pay) and emphasis on variable pay are significantly related to risk, we did not find a consistently positive relationship. In fact, across risk measures, the relationship between risk and base or total pay is negative. Coefficients for the regression of compensation decisions on risk, after removing the effects of control variables, are in Tables 2, 3, and 4. Higher historical income stream risk (SD of ROA) is negatively related to base pay and total pay (Table 2). The coefficients for base pay ( $\beta = -.40$ ,  $p < .01$ ) and total pay ( $\beta = -.58$ ,  $p < .01$ ) are significant and negative. The magnitude of the betas is small because the dependent variable was the residual from our regressions controlling for human capital factors. Strategic risk is also negatively related to base and total pay (base pay:  $\beta = -.007$ ,  $p < .01$ ; total pay:  $\beta = -.13$ ,  $p < .01$ ; Table 3). Systematic stock market risk was not associated with both higher base pay ( $\beta = .009$ , ns, Table 4), but it was related to higher total pay ( $\beta = .61$ ,  $p < .01$ , Table 4). The positive association with higher total pay appears to be related to greater use of variable pay, an issue we address below. However, the preponderance of our results are directly opposite of our agency-based predictions. We anticipated that higher levels of business risk would require a risk premium to compensate or insure employees against the higher level of risk. This hypothesis has been supported in previous research relating organization-level risk to compensation levels (Conlon and Parks, 1988; Eisenhardt, 1988). Our data suggest otherwise, indicating that higher risk is associated with both *lower* base and total pay.

**TABLE 2**

Regression results of the relationship between  
standard deviation of ROA and compensation policies<sup>a</sup>  
(standard error of estimates in parentheses)

	<b>Variable Pay<sup>b</sup></b>	<b>Base Pay<sup>b</sup></b>	<b>Bonus<sup>b</sup></b>	<b>Total Pay<sup>b</sup></b>
Std. dev. of ROA	-.07***	-.40***	-1.18***	-1.58***
	(.01)	(.08)	(.19)	(.25)
Year	.003***	.06***	.09***	.16***
	(.0001)	(.0007)	(.002)	(.002)
F	123.32***	191.39***	139.68***	155.75***
R <sup>2</sup>	.36	.46	.38	.41

•p<.10; •p<.05; \*\*\*p<.01

<sup>a</sup> - Equations include dummy variables for each organization

<sup>b</sup> - Pay variables are residuals from regressions of pay on age, job level, and organizational tenure

**TABLE 3**

Regression results of the relationship between  
capital intensity and compensation policies<sup>a</sup>  
(standard error of estimates in parentheses)

	<b>Variable Pay<sup>b</sup></b>	<b>Base Pay<sup>b</sup></b>	<b>Bonus<sup>b</sup></b>	<b>Total Pay<sup>b</sup></b>
Capital Intensity	-.01*** (.001)	-.007*** (.00007)	-.12*** (.02)	-.13*** (.03)
Year	.003*** (.0001)	.06*** (.0007)	.09*** (.002)	.16*** (.002)
F	125.2***	190.98***	139.33***	155.42***
R <sup>2</sup>	.36	.46	.38	.41

•p<.10;••p<.05;•••p<.01

<sup>a</sup> - Equations include dummy variables for each organization

<sup>b</sup> - Pay variables are residuals from regressions of pay on age, job level, and organizational tenure

**TABLE 4**

Regression results of the relationship between systematic stock market risk (beta) and compensation policies<sup>a</sup>  
(standard error of estimates in parentheses)

	<b>Variable Pay<sup>b</sup></b>	<b>Base Pay<sup>b</sup></b>	<b>Bonus<sup>b</sup></b>	<b>Total Pay<sup>b</sup></b>
Beta	.05*** (.005)	.009 (.03)	.60*** (.07)	.61*** (.09)
Year	.002*** (.0001)	.06*** (.0007)	.09*** (.002)	.16*** (.002)
F	123.51***	191.28***	139.75***	155.73***
R <sup>2</sup>	.35	.47	.38	.41

•p<.10;..p<.05;...p<.01

<sup>a</sup> - Equations include dummy variables for each organization

<sup>b</sup> - Pay variables are residuals from regressions of pay on age, job level, and organizational tenure

**Risk and Variable Pay**

Also in direct contrast to agency predictions, we found that higher risk is not significantly and positively related to the use of variable pay. In fact, the relationship seems to be negative (Tables 2 to 4). Higher levels of income stream risk are negatively associated with variable pay. The coefficient is  $-.07$  for incentive pay ( $p < .01$ ; Table 2) and  $-.01$  for higher capital intensity ( $p < .01$ , Table 3). We hypothesized that higher levels of risk would force principals to rely more heavily on incentive pay to direct agent's actions. The data refute that hypothesis. The results are robust; 95% confidence intervals for variance in ROA and capital intensity are  $-.05$  to  $-.09$  and  $-.008$  to  $-.012$ , respectively. These confidence intervals do not contain either zero or a positive value indicating that the range of probable coefficients includes only negative values. However, as with the pay level data, systematic stock market risk exhibited a positive relationship to variable pay. The coefficient for beta was  $.05$  ( $p < .01$ ; Table 4) indicating that companies whose stock returns are more volatile than the market in general also use a greater proportion of variable pay in their executives' compensation packages. The 95% confidence interval for the regression coefficient is  $.04$  to  $.06$  which does not include zero or negative values.

**Risk, Variable Pay, and Firm Performance**

The results of our analysis relating performance-based pay, risk, and firm performance also provide a rich and revealing picture. Regression coefficients for the relationship between variable compensation, risk, and firm performance are presented in Tables 5 and 6. Even though the relationships are complex, our data clearly support the proposition that the effects of incentive pay on firm performance are dependent upon the level of business risk. These data are significant from both a risk-return and a compensation-performance perspective. That is, our data indicate that failure to consider the effects of risk and variable pay together (i.e., including only incentive compensation or risk) might lead to erroneous conclusions.

**TABLE 5**

Regressions of firm total shareholder return on  
risk, variable pay, and base pays  
(standard error of estimates in parentheses)

Indicator for Organization	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>		<b>Model 5</b>		<b>Model 6</b>	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Lagged Performance	---	-.008*** (.002)	---	-.007*** (.001)	---	---	---	---	---	---	---	---
Lagged Variable Pay	-.16 (.86)	.14 (.85)	.05 (.34)	.20 (.34)	.009 (.53)	.29 (.77)						
Capital Intensity	-.02 (.07)	-.01 (.07)										
Capital Intensity * Variable Pay	-.40 (.96)	-.45 (.94)										
Beta			.38** (.19)	.30 (.19)								
Beta * Variable Pay			-14.81*** (3.83)	-12.93*** (3.81)								
SD of ROA									-.53 (.76)	-1.40* (.77)		
SD of ROA * Variable Pay									-13.38 (11.59)	-13.34 (11.38)		
Lagged Base Pay	.07 (.06)	.07 (.06)	.04 (.06)	.05 (.05)	.07 (.06)	.07 (.05)						
F	1.09	1.20**	1.21**	1.29***	1.10	1.22**						
R <sup>2</sup>	.33	.35	.35	.36	.33	.35						

• p < .10; \*\* p < .05; \*\*\* p < .01

<sup>a</sup>Pay variables are residuals from regressions of pay on age, job level, and organizational tenure



**TABLE 6**

Regressions of firm return on investment on  
risk, variable pay, and base pay<sup>a</sup>  
(standard error of estimates in parentheses)

Indicator for Organization	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>		<b>Model 5</b>		<b>Model 6</b>	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Lagged Performance	---	.002• (.001)	---	.001 (.001)	---	.001 (.001)	---	.001 (.001)	---	.001 (.001)	---	.001 (.001)
Lagged Variable Pay	.22 (.44)	.01 (.36)	.15 (.25)	.78*** (.28)	.28 (.31)	.24 (.26)						
Capital Intensity	-.06 (.04)	-.04** (.02)										
Capital Intensity * Variable Pay	-.34 (.46)	-.14 (.38)										
Beta			-.19 (.14)	-.06 (.13)								
Beta * Variable Pay			-5.18** (2.81)	-5.31** (2.74)								
SD of ROA									-2.03*** (.46)	-.86*** (.29)		
SD of ROA * Variable Pay									-5.18* (2.81)	-5.31* (2.74)		
Lagged Base Pay	.01 (.02)	.03 (.03)	.03 (.04)	.002 (.03)	.01 (.03)	.01 (.03)						
F	1.63***	5.16***	1.71***	4.12***	1.75•	6.58***						
R <sup>2</sup>	.40	.03	.43	.02	.41	.03						

• p < .10; \*\* p < .05; \*\*\* p < .01

<sup>a</sup>Pay variables are residuals from regressions of pay on age, job level, and organizational tenure

Like Aaker and Jacobson (1987), and in contrast to the findings of Miller and Bromiley (1990), we found systematic stock market risk was positively related to firm performance. We note again that both our measure of beta and our measures of performance differed from Miller and Bromiley's (1990). We followed the CAPM, which controls for the risk-free rate of return in computing beta, and we used total shareholder return and ROI. The positive relation of beta holds up in the ROI analyses, an outcome more consistent with Miller and Bromiley (1990). However, our data regarding both income stream risk (SD of ROA) and strategic risk (capital intensity) confirm Miller and Bromiley's (1990) findings. Where significant, the relationship between capital intensity and variance in ROA was negatively associated with both measures of firm performance (Tables 5 & 6). These last results are also congruent with Bowman's (1982, 1984) risk-return paradox in that firms pursuing a higher risk strategy paradoxically exhibit lower performance.

Surprisingly, we did not find that higher levels of base pay among higher risk companies was associated with higher return. Indeed, our results suggest that, regardless of the nature of the relationship, higher levels of base pay are not associated with differences in firm performance (Tables 5 & 6). None of the coefficients are significantly positive which was our agency-based prediction. We note, however, that some of our estimated regression equations had low explanatory power (the even numbered models in Table 6). In those equations that did not include fixed-effects, the proportion of firm returns explained by the covariates was less than 10%. The variance explained in equations controlling for the unique effects of each firm was much higher, in all cases greater than 30%, suggesting that firm-specific factors account for a significant proportion of the variance in compensation contracts. This indicates that the affect of compensation on firm performance might be idiosyncratic or firm-specific, a notion we pursue later in more detail.

We analyzed the relationship between compensation and risk measures on firm performance by including an interaction term. The interaction term allows us to investigate whether the relationship between use of variable compensation and firm performance is conditional on the level of business risk. For example, after controlling for other covariates, the relationship between variable pay (bonus-to-base ratio), income stream risk, and firm total shareholder return can be expressed as:

$$[(\beta_{\text{pay}} + \beta_{\text{interaction}} * \text{Risk}) \text{ Pay}] + [\text{Intercept} + (\beta_{\text{risk}} * \text{Risk})]$$

(Cohen & Cohen, 1983). Thus, the relationship between use of variable pay and firm performance is conditional on the firm's level of business risk.

Contrary to our expectations, the results indicate that higher levels of risk and higher variability in pay are associated with *lower* firm performance. First, the main effect for variable pay, after controlling for risk, is not significant in any of the twelve models we ran. Gerhart and Milkovich (1990) found that greater bonus-to-base ratio was associated with higher ROA. Using different measures of performance, we found that this relationship is moderated by the risk level of the organization. Where significant, the interaction terms for bonus-to-base ratio and risk are negative across measures of firm performance (Tables 5 & 6). These data suggest that, contrary to agency-based predictions, high risk firms which rely more heavily on incentive pay are more likely to experience poorer performance. The results were strongest for systematic stock market risk. This finding may be due, however, to the fact that our measures of organizational performance were both equity-oriented proxies. Firms with higher levels of systematic stock market risk which also use higher levels of variable pay experience considerably lower total shareholder returns ( $\beta = -14.81$ ,  $p < .05$ , Model 3, Table 5;  $\beta = -12.93$ ,  $p < .01$ , Model 4, Table 5;  $\beta = -5.18$ ,  $p < .01$ , Model 3, Table 6;  $\beta = -5.31$ ,  $p < .01$ , Model 4, Table 6). Although the interaction coefficients for capital intensity, historical variance in ROA, and incentive pay are nonsignificant, they are all negative versus the positive coefficients we predicted. These data conflict with other variable pay-performance research (e.g., Abowd, 1990; Leonard, 1990). At the very least, these data demonstrate that the risk-return relationship is more complex than previously postulated in the agency-compensation related literatures.

Our results suggest that the effects of incentive pay on organizational performance is dependent upon a company's risk position. However, how risk and performance are measured clearly has implications for understanding the relationship. Greater capital intensity (i.e., higher strategic risk) does not appear to moderate the relationship between firm performance and contingent pay, but greater income stream variability does. These data indicate that, consistent with the conclusions of Miller and Bromiley (1990), different operationalizations of risk result in different relationships with firm performance. Our data have extended those conclusions by suggesting that different definitions of risk also mitigate the compensation-firm performance relationship.

## DISCUSSION

### Implications for compensation research

Our results raise serious questions about the predictions made by previous strategic-contingent and agency-based compensation research regarding variable pay. We suggest that organizations facing higher risk do not place greater emphasis on short-term variable pay, indeed they place less emphasis on it. And most surprisingly, those high income stream risk

firms which do use variable compensation seem to experience poorer financial returns. The data provided evidence contrary to all three propositions we made based upon agency and strategic-contingent theories. Including risk considerations appears to alter the observed pay-performance relationship substantially. These results suggest that the employment contract is more complex than modeled by previous agency and strategic-contingent research with their emphasis on performance contingent pay.

Our results indicate that the predictive power of the agency model needs to include a multi-dimensional view of risk. Since some of the results differ depending on how risk was measured, it is possible decisions makers might react differently to different sources of risk. A better understanding of the conditions under which agency predictions hold may be gained by examining different sources of risk and how they are related to compensation decisions. Much remains to be learned about dimensions of risk and their relationship to organizational strategy and outcomes (Miller & Bromiley, 1990). Even so, research has shown that risk influences firm performance. Our study extends that research by indicating risk might also influence other strategic performance relationships.

We suggest that agency theory as typically described tells only part of the story. That is, principals might act to align agent behaviors through the use of variable pay schemes, but its effect on an agent's behavior may be more complex than typically assumed by agency-based research. Perhaps greater risk imposes greater uncertainty in the employment relationship and firms reduce (rather than increase) the variability in pay to offset this increased risk (Simon, 1951). Simon (1951, 1991) was among the first to apply a formal structure to the relationship between risk and compensation. He modeled the employment relationship as a contract between the employer and employee which stipulates the mutual obligations and reciprocal returns of both parties. By noting that both the employer and employee attempt to structure the contract to protect themselves from uncertainty, Simon (1951) introduced the concept of risk into the employment contract. Accordingly, risk influences both the form and outcomes of the employment contract. Employees require that higher risk in one element of the employment contract (e.g., probable length of the contract; employee's obligations) be offset by less risk in another component (e.g., more stable pay). Based upon Simon's (1951, 1991) framework, higher ambiguity about future firm returns would induce agents to demand lower risk in their pay package.

In addition to concerns about risk in pay, agent behaviors might also be influenced by perceptions about other sources of risk in the employment relationship, including employment security. Recent research on psychological employment contracts indicates employees are

concerned about the length of the employment relationship, among other conditions (Guzzo, Noonan, & Elron, 1994; Rousseau, 1990). We need to know more about how employees process risk in the employment relationship, especially risk related to pay and other general employment factors like loss of employment, risk of a lay-off, loss of promotability, or chances for unfavorable assignments. Furthermore, we need to learn how these perceptions are formed, what their antecedents are, how these perceptions influence work-related behaviors and attitudes, and what conditions moderate these relationships. Employee dispositions, which have already been shown to significantly impact job and pay satisfaction (Judge, 1992), might be important mediators of these perceptions. We believe our results are sufficiently strong to suggest that gaining a greater understanding of how employees process and react to risk will add greatly to the predictive power of agency and strategic-contingent theories.

The resource-based view of the firm (Barney, 1990; Cappelli & Singh, 1992; Wright, McMahan, & McWilliams, 1994), which suggests that a firm's unique bundle of resources has implications for its ability to sustain a competitive advantage, might offer some additional insights into our results. That is, the effects of compensation on firm performance might be idiosyncratic, depending more upon the unique resources a firm possesses and the particular environment a firm faces. The larger  $R^2$ 's of our fixed-effects ROI models tend to support to this approach. In other words, unique firm-level factors seem to explain a significant proportion of the variance in financial returns. This view suggests that the search for broad-based compensation effects or compensation-strategy matches should be substituted with a search for strategic patterns of human resource bundles and compensation decisions. According to the resource-based view, broad-based research on the compensation-performance relationship may only uncover very general relationships with low explanatory power, especially when predicting the relationship for individual organizations or groups of companies. For example, while large investments in capital might be risky for some firms because of their constraining effect on labor-related resources (e.g., forcing the firm to cut compensation expenses or hold them steady), it might not be risky for a firm with a highly committed, loyal work force willing to weather a period of less-competitive or even lower pay. Therefore, understanding the effects of a performance-based pay on organizational performance necessitates inclusion of a number of organization-specific characteristics, one of which is risk. Although the resource-based view holds promise for furthering our understanding of the efficacy of performance-based pay, it may also simply be changing the definition of fit. Instead of fit based upon strategic-contingent theory (i.e., environment-business strategy-compensation decisions), the resource-based definition of fit is the match between the compensation plan and the firm's unique bundle of human

resources. Furthermore, whether risk is one dimension of a firm's environment (i.e., external to the firm and, therefore, not a firm-specific characteristic), a result of its unique resource bundle (e.g., a by-product of its unique production process or geographic location), or a product of the firm's strategic decisions remains to be answered. The strategic role of compensation in directing employee behaviors in the midst of risk would likely differ if risk is something foisted upon a firm as opposed to a strategic position adopted by executive decision makers.

Another potential explanation for these results is that higher risk firms simply lack the financial resources to pay their employees competitively. However, given the fact that our data were drawn from very large, well established firms, this alternative explanation seems less plausible. Investigating firms from a wider sample of organizations, which includes both small and large firms, might lend additional information to resolve this inconsistency.

Another area that is in great need of research is the relationship between long-term incentive pay, risk, and firm performance. Beatty and Zajac (1994) have shown that the use of long-term incentive pay is related to business risk. However, we need to know more about the risk-long-term incentive pay-organizational performance relationship. Agency theory does not make clear predictions about how short- and long-term incentive pay might exert different influences on subsequent firm performance. Since longer-term incentive pay is a large part of many executive's pay packages (Bloedorn & Chingos, 1994), examining the interaction of long-term pay and risk on firm outcomes seems important. Agency theorists suggest that compensation might constrain managers decisions to those that influence immediate compensation returns, i.e., increasing short-run profits, over those that have long-term benefits for the firm. Clearly, the long-term focus of some forms of compensation might exhibit a greater relationship to strategic decisions which have a pay-off at some future date. In this case, both the operationalization of risk and performance should be different than many of the more widely used measures (e.g., S.D. of ROA, annual total shareholder return, return on investment).

Our results do indicate the importance of considering business risk in analyses of both the use and efficacy of incentive pay. Such considerations are particularly important in agency-based compensation research since traditional agency models stress the importance of risk in the efficacy of compensation (Holmstrom, 1979; Jensen & Meckling, 1976). Excluding measures of risk appears to be an important omission.

### **Implications for organizational decision makers**

Our study suggests organizational decision makers should use caution before wholeheartedly embracing performance-based pay as advocated so widely by consultants and popular pay pundits. Higher risk organizations may create uniquely difficult conditions for

determining the optimal pay plan. Our data do suggest that incentive pay is not the panacea many currently considered it to be. We were not able to investigate the effects on firm performance of longer-term oriented incentive pay schemes, such as stock option plans, and have already stressed the important implications such conclusion might have for our understanding of compensation.

### **Limitations and directions for future research**

Our study is the first to test the predictions agency and strategic-contingent theories make about the relationship between risk, pay, and firm performance. But it is not without its limitations. First, the data were drawn from larger companies in the U.S. As exemplified by Beatty and Zajac (1994), smaller, more entrepreneurial businesses would provide another, perhaps unique data source for analyzing the relationship between risk, compensation and firm performance. Entrepreneurial firms are often considered to be high risk, high growth potential ventures and, therefore, may offer a different context in which to test agency-based predictions. Our measures of variable compensation were predominantly short-term pay measures. Long-term pay practices could also provide another dimension for investigation of the risk, compensation, performance relationship. In fact, it has been suggested that variable compensation based on long-term measures has greater strategic advantage than short-term measures (Bloedorn, 1992; Hewitt, 1993).

Our data did not provide information about the actual measures upon which performance-contingent pay was based. If principals do attempt to align agent behaviors through performance-based pay, the actual measures used to determine variable compensation payouts are important. Our study provides some indication of this importance since some results differed depending upon how risk was characterized. For example, the association between risk, pay, and performance might be positive when a clear performance target is established, employees believe they can effect the performance target, and pay is truly contingent upon changes in the target. Under such a scenario, we would expect a positive relationship, even if the firm was pursuing a more risky strategy.

In sum, we believe that more must be learned about the employee's perspective as it relates to agency and strategic-contingent models. Simply assuming a risk averse agent may not capture the full range of attitudes and behaviors employees exhibit under risk. It also may not adequately specify how agent's reactions to risk are mediated or moderated by different sources of risk and other components of the employment contract. Providing policy makers with more information about how employees react to risk in the employment relationship, especially

risk related to compensation, would assist them in making better decisions about how pay can support overall business objectives.



## REFERENCES

- Aaker, D. A., & Jacobson, R. 1987. The role of risk in explaining differences in profitability. Academy of Management Journal, 30: 277-296.
- Abowd, J. M. 1990. Does performance-based managerial compensation affect corporate performance? Industrial and Labor Relations Review, 43: 52S-73S.
- Amihud, Y., & Lev. B. 1981. Risk reduction as a managerial motive for conglomerate mergers. Bell Journal of Economics, 20:605-617.
- Amit, R., & Livnat, J. 1988. Diversification and the risk-return trade-off. Academy of Management Journal, 31: 154-166
- Baker, G. P., Jensen, M. C., & Murphy, K. J. 1988. Compensation and incentives: Practice versus theory. The Journal of Finance, 33: 593-616.
- Barney, J. B. 1990. The debate between traditional management theory and organizational economics. Academy of Management Review, 15: 382-393.
- Beatty, R. P., & Zajac, E. J. 1994. Managerial incentives, monitoring, and risk bearing: A study of executive compensation, ownership and board structure in initial public offerings. Administrative Science Quarterly, 39: 313-335.
- Black, F., Jensen, M. C., & Scholes, M. S. 1972. The capital asset pricing model: Some empirical tests. In M. C. Jensen (Ed.), Studies in the theory of capital markets (pp. 79-121), New York: Praeger.
- Bloedorn, J. 1992. Compensation model, Chicago: KPMG Peat Marwick.
- Bloedorn, J. D., & Chingos, P. T. 1994. Executive pay and company performance. ACA Journal Autumn: 70-89.
- Bowman, E. H. 1982. Risk seeking by troubled firms. Sloan Management Review. 23: 33-42.
- Bowman, E. H. 1984. Content analysis of annual reports for corporate strategy and risk. Interfaces 14: 61-71.
- Cappelli, P., & Singh, H. 1992. Integrating strategic human resources and strategic management. In D. Lewin, O. S. Mitchell, and P. D. Sherer (Eds.), Research frontiers in industrial relations and human resources (pp. 165-192), Madison, WI: Industrial Relations Research Association
- Cohen, J., & Cohen, P. 1983. Applied multiple regression/ correlation analysis for the behavioral sciences, Hillsdale, N.J.: Lawrence Erlbaum Associates.
- Conference Board. 1993. Innovative Reward and Recognition Strategies in TQM, New York: The Conference Board, Inc.

- Conlon, E. J., & Parks, J. M. 1990. Effects of monitoring and tradition on compensation agreements: An experiment on principal-agent dyads. Academy of Management Journal 33:603-622
- Crystal, G. S. 1991. In search of excess: The overcompensation of American executives, New York: Norton.
- Deckop, J. R. 1988. Determinants of chief executive officer compensation. Industrial and Labor Relations Review, 41: 215-226
- Dorsey, D. 1994. The force, New York: Random House.
- Ehrenberg, . G., & Smith, R. 1991. Modern labor economics: Research and public policy. New York: HarperCollins.
- Eisenhardt, K. M. 1988. Agency- and institutional-theory explanations: The case of retail sales compensation. Academy of Management Journal, 31: 488-511.
- Eisenhardt, K. M. 1989. Agency theory: An assessment and review. Academy of Management Review, 14: 57-74.
- Fama, E., & Jensen, M. C. 1983. Separation of ownership and control. Journal of Law and Economics, 26: 301-325.
- Fiengenbaum, A., & Thomas H. 1988. Attitudes toward risk and the risk-return paradox. Academy of Management Journal, 31: 85-106.
- Gerhart, B., & Milkovich, G. T. 1990. Organizational differences in managerial compensation and financial performance. Academy of Management Journal, 33: 663-691.
- Gerhart, B., & Milkovich, G.T. 1992. Employee compensation: Research and Theory. In M.D. Dunnette & L.M. Hough (Eds.), Handbook of industrial and organizational psychology (2nd ed., Vol. 3, pp. 481-569), Palo Alto, CA: Consulting Psychologists Press.
- Gibbons, R. 1992. Optimal incentive contracts in the presence of career concerns: Theory and evidence. Journal of Political Economy, 100: 468-505.
- Gomez-Mejia, L. R., & Balkin, D. 1989. Effectiveness of individual and aggregate compensation practices. Industrial Relations, 28: 431-445.
- Gomez-Mejia, L. R., & Balkin, D. 1992. Compensation, organizational strategy, and firm performance. Cincinnati, OH: Southwestern Publishing.
- Gomez-Mejia, L. R., Tosi, H., & Hinkin, T. 1987. Managerial control, performance, and executive compensation. Academy of Management Journal, 30: 51-70.
- Govindarajan, V., & Fisher, J. 1990. Strategy, control systems and resource sharing: Effects on business-unit performance. Academy of Management Journal, 33: 259-285.
- Guzzo, R. A., Noonan, K. A., & Elron, E. 1994. Expatriate managers and the psychological contract. Journal of Applied Psychology, 79:617-626.

- Heneman, R. L. 1992. Merit pay: Linking pay increases to performance ratings. Reading, MA: Addison-Wesley.
- Hewitt Associates. 1993. On Compensation, July/August.
- Holmstrom, B. 1979. Moral hazard and observability. Bell Journal of Economics, 10:7491.
- Hoskisson, R. E., Hitt, M. A., and Hill, C. W. 1993. Managerial incentives and investment in R & D in large multiproduct firms. Organization Science, 4:325-341.
- Hoskisson, R. E., Hitt, M. A., Turk, T. A., & Tyler, B. B. 1989. Balancing corporate strategy and executive compensation: Agency theory and corporate governance. In K. M. Rowland & G. R. Ferris (Eds.), Research in personnel and human resource management (Vol. 7, pp. 25-57), Greenwich, CT: JAI Press.
- Hoskisson, R. E. & Turk, T. A. 1990. Corporate restructuring: Governance and control limits of the internal capital market. Academy of Management Review, 15: 459-477
- Jacob, N. 1971. The measurement of systematic risk for securities and portfolios: Some empirical results. Journal of Financial and Quantitative Analysis, 6: 815-834.
- Jensen, M. C. 1983. Organization theory and methodology. Accounting Review, 56:319338.
- Jensen, M. C., & Meckling, W. 1976. Theory of the firm: Managerial behavior, agency costs, and ownership structure. Journal of Financial Economics, 3:305-360.
- Jensen, M. C., & Murphy, K. J. 1990. Performance pay and top-management incentives. Journal of Political Economy, 98: 225-264.
- Jensen, M., & Smith, C. 1990. Stockholder, manager, and creditor interests: Applications of agency theory. In E. Altman and M. Subrahmanyam (Eds.), Recent advances in corporate finance, Homewood, IL: Down Jones-Irwin.
- Johnson, R. A., & Wichern, D. W. 1992. Applied multivariate statistical analysis. Englewood Cliffs, NJ: Prentice Hall.
- Judge, T. A. 1992. The dispositional perspective in human resources research. in K. M. Rowland & G. R. Ferris (Eds.), Research in personnel and human resources management (Vol. 10, pp. 31-72), Palo Alto, CA: JAI Press.
- Kerr, J. L., & Bettis, R. A. 1987. Boards of directors, top management compensation and shareholder returns. Academy of Management Journal, 30: 745-764.
- Kohn, A. 1993. Why incentive plans cannot work. Harvard Business Review, Sept-Oct: 54-63.
- Kroll, M., Simmons, S. A., & Wright, P. 1990. Determinants of chief executive office compensation following major acquisitions. Journal of Business Research, 20:349366.
- Leonard, J. S. 1990. Executive pay and firm performance. Industrial and Labor Relations Review, 43: 13S-29S.

- McAdams, J. L., & Hawk, E. J. 1994. Organizational Performance & Rewards, Phoenix, AZ: American Compensation Association.
- Milkovich, G. T., Gerhart, B., & Hannon, J. 1991. The effects of research and development intensity on managerial compensation in large organizations. Journal of High Technology Management Research, 2:133-150.
- Milkovich, G. T., & Newman, J. M. 1993. Compensation (4th ed.), Homewood, IL: Irwin.
- Miller, K., & Bromiley, P. 1990. Strategic risk and corporate performance: An analysis of alternative risk measure. Academy of Management Journal, 33: 759-779.
- Miller, M. D., & Scholes, M. S. 1972. Rates of returns in relation to risk: A reexamination of recent findings. In M. C. Jensen (Ed.), Studies in the theories of capital markets (pp. 47-78), New York: Praeger.
- Modigliani, F., & Pogue, G. A. 1993. An introduction to risk and return: Concepts and evidence. In S. Levine, (Ed.), Financial analysts handbook, New York: Dow Jones - Irwin.
- Murphy, K. 1986. Incentives, learning, and compensation: A theoretical and empirical investigation of managerial labor contracts. Rand Journal of Economics 17: 59-76.
- Nalbantian, H. R. 1987. Incentive compensation in perspective. In H. R. Nalbantian (Ed.), Incentives, cooperation and risk sharing (pp. 3-46), Totowa ,NJ: Rowan & Littlefield.
- Quinn, D. P., & Rivoli, P. 1993. The effects of American- and Japanese-style employment and compensation practices on innovation. Organization Science, 2:323-341.
- Rousseau, D. 1990. New hire perceptions of their own and their employers' obligations: A study of psychological contracts., Journal of Organizational Behavior, 11: 389-400.
- Ruefli, T. W., & Wiggins, R. R. 1994. When mean square error becomes variance: A comment on "Business risk and return: A test of simultaneous relationships." Management Science, 40:750-759.
- Scholes, M. S. 1991. Stocks and compensation. Journal of Finance, 46: 803-823.
- Simon, H. A. 1951. Formal theory of the employment relationship. Econometrica, 19: 293-305.
- Simon, H. A. 1991. Organizations and markets. Journal of Economic Perspective, 5: 254-4.
- Sitkin, S. B., & Pablo, A. L. 1992. Reconceptualizing the determinants of risk behavior. Academy of Management Review, 17: 9-38.
- Standard & Poor's 1992. COMPUSTAT PC Plus User's Guide, Englewood, CO: Standard & Poor's COMPUSTAT services.
- Stiglitz, J. E. 1987. The design of labor contracts: The economics of incentives and risk-sharing. In H. R. Nalbantian (Ed.), Incentives, cooperation and risk sharing (pp. 47-68), Totowa, NJ: Rowan & Littlefield.

- Tosi, H. L., & Gomez-Mejia, L. R. 1989. The decoupling of CEO pay and performance: An agency theory perspective. Administrative Science Quarterly, 34: 169-189.
- Walsh, J. P., & Seward, J. K. 1990. On the efficiency of internal and external corporate control mechanisms. Academy of Management Review, 15: 421-458.
- Wright, P. M., McMahan, G. C., & McWilliams, A. 1994. Human resources and sustained competitive advantage: a resource-based perspective. International Journal of Human Resource Management, 5:301-32