REFERENCES

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THE FIT BETWEEN CEO COMPENSATION DESIGN AND FIRM RISK

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We examined the effects of unsystematic and systematic firm risk on CEO compensation risk bearing and total pay. Both the proportion of variable pay in CEO pay packages and their magnitude are curvilinearly related to unsystematic firm risk—that is, they are highest under conditions of moderate firm-specific risk. Our results are consistent with agency theory predictions that both performance-contingent pay and the greater earnings potential associated with that form of pay are highest when an agent has greater control over performance outcomes.

Recent research on CEO pay has moved away from decades of mostly futile attempts to find blanket evidence of the value of incentive alignment (linking a portion of executive pay to specific performance criteria) at the top executive ranks. Instead, scholars are shifting their attention toward the identification of those conditions under which incentive alignment and, thus, risk sharing with CEOs, is most appropriate (e.g., Bloom & Milkovich, 1998; Gray & Cannella, 1997). Most of these authors have relied on agency theory as the basis for their predictions as to when placing some of the risk associated with the outcomes for a firm on its chief executive will align the preferences of that CEO with those of shareholders. From this perspective, the main challenge for firms lies in designing compensation contracts that balance the advantages of incentives (fostering a common fate for principal and agent by inducing executives to engage in strategies consistent with shareholders' preferences) with the disadvantages of asking risk-averse agents to bear excessive risk (which may prompt executives to adopt low risk-low return strategies) (Murphy, 2000).

A consistent prediction in this literature is that transferring risk from a principal to an agent by linking a portion of the agent's (a CEO's) income to firm performance becomes less instrumental or even dysfunctional "the greater the extent to which there is uncertainty over performance outcomes" (Gray & Canella, 1997: 518). Such uncertainty is also known as firm risk. Such a pay policy would aggravate a CEO's risk bearing, making it less likely that he or she would invest firm resources in a risk-neutral manner or engage in strategies congruent with shareholders' preferences. Both conceptually and empirically, authors have envisioned a negative relationship between firm risk and the use of performance-contingent compensation for CEOs. We argue and provide general empirical support for the notion that this relationship is concave rather than monotonically negative and for the notion that the amount of pay received by a chief executive has a similar, nonlinear relationship with firm risk. Furthermore, we find support for the hypothesis that this nonlinear relationship for performance-contingent pay is stronger in the case of unsystematic (firm-specific) risk than in the case of systematic (general) risk.

This study extends the literature on CEO pay design in several important ways. First, in a departure from prior work, we use agency logic to argue that reliance on performance-contingent pay at both high and low levels of firm risk engenders agency costs for shareholders. Thus, at moderate levels of firm risk, linking pay to performance is most likely to be advantageous to shareholders. Second, diverging from prior predictions that firm risk and CEO compensation level go up in tandem (e.g., Gray & Cannella, 1997), we predict that total pay will be greatest when firm risk is moderate, consistent with the greater compensation risk bearing in that context. Lastly, we show that a nonmonotonic relation between firm risk and compensation risk sharing is more likely to occur for firm-specific performance risk than for market-driven risk. In sum, this study compares the effects of firm risk on pay design across different levels and types of risk.

CONCEPTUAL FRAMEWORK

Fundamentally, agency theory focuses on controlling the behavior of agents to ensure that it is consistent with the objectives desired by the party paying for the agent's services, the principal (Jensen & Meckling, 1976). Because both agent and principal are self-serving, the so-called agency problem arises, the possibility that the agent will take advantage of its privileged position at the expense of the principal. One way to curb an agent's opportunism is to design outcome-based, performance-contingent plans. "Such contracts co-align the preferences of agents with those of the principal because the rewards for both depend on the same actions and therefore the conflicts of self-interest between principal and agent are reduced" (Eisenhardt, 1989: 60). Such a common fate for principal and agent comes at the price of transferring risk to the agent, who may protect himself or herself by making risk-averse decisions that do not optimize the interests of a risk-neutral principal.

At the heart of principal-agent theory is the issue of when it becomes efficient to base an agent's rewards on outcomes, where such outcomes are surrogate measures for behaviors (Singh, 1985). Agency theorists suggest that three related factors should be considered in deciding how much to rely on performance-contingent incentives as a governance mechanism to ensure that an agent is working to achieve a principal's objectives. First and foremost is the degree of control that the agent can exercise over performance outcomes. Drawing on expectancy-based utility models of motivation (Lawler, 1971), agency theorists have argued that contingent pay can only be effective in inducing the types of behaviors needed to achieve desired results when an agent can control or influence outcomes (Holmstrom, 1979; Mirrlees, 1976). Transferring pay risk to the agent when poor or good outcomes are largely independent of the agent's efforts (when, in the jargon of expectancy theory, there is low instrumentality) may mean that agents react by withholding effort or by taking evasive actions designed to reduce their risk exposure. Examples include broadening diversification at the expense of profits (Amihud & Lev, 1981), cutting back R&D spending (Baysinger, Kosnik, & Turk, 1991), and avoiding high risk–high return projects (Hoskisson, Hitt, Turk, & Tyler, 1989). A second factor to consider is the extent to which reliable information about agent behavior is readily and cheaply available. The more such information that is available, the less appropriate it would be to reward the agent for outcomes (Eisenhardt, 1985, 1989). Lastly, principals need to consider the total compensation costs associated with the use of performance-contingent incentives. In exchange for increased risk bearing, agents are likely to demand greater total compensation. Thus, principals need to balance the advantages of performance-contingent pay with the costs of the additional inducements needed to secure agents' services under this compensation arrangement (Holmstrom, 1987; Shavell, 1979).

One stream of research has examined the relationship between the risk inherent in the measure of executive performance a firm uses and pay design. A common view in that research, which we review shortly, is that compensation risk bearing should be a decreasing function of the noise in the performance measure. Specifically, the higher the uncertainty in the outcome measures (which are typically assessed as variability coefficients), the less agents should be paid on a performance-contingent basis. This linear prediction about the relation between compensation risk bearing and performance uncertainty is based on consideration of the three factors noted above. Specifically, as performance uncertainty (firm risk) increases (1) an agent has less control over outcomes, so that the instrumentality of effort becomes weaker and weaker and the agents are pushed to adopt risk reduction strategies damaging to shareholders' interests; (2) information about agent decisions becomes less reliable and more costly to obtain, yet the principal cannot rely on outcome-based controls as an adequate substitute; and (3) agents demand greater pay to bear higher risk. "If high risk compensation contracts are imposed on executives with no corresponding increase in pay level, higher quality executives may seek opportunities elsewhere" (Gray & Cannella, 1997: 518).

A representative sample of these studies in the management literature includes those of Eisenhardt (1988), Beatty and Zajac (1994), Gray and Cannella (1997), and Bloom and Milkovich (1998). Eisenhardt (1988) reported that the sales-compensation policies of 54 retail specialty stores was characterized by a positive relationship between outcome uncertainty and the use of salaries, but the reverse was true for the use of commissions. Beatty and Zajac (1994) found, in a sample of 435 initial public offering (IPO) firms, a "consistent inverse relationship between the levels of firm risk and the degree to which incentive compensation for top managers is used . . . as an example, a one standard-deviation increase in the number of risks an IPO firm faces leads to a 63 percent reduction in the probability that a firm offers stock options" (1994: 329). Gray and Cannella (1997) found, in a random sample of 100 of the 1,000 largest publicly traded firms, that

unsystematic market-based risk (defined as sigma in the Capital Asset Pricing Model [CAPM]) was negatively associated with the ratio of incentive compensation to total compensation. More recently, Bloom and Milkovich (1998) used an average of 75 randomly selected managers from each of 740 firms in Cornell University's Center for Advanced Human Resource Studies (CAHRS) database to test the notion that there is an inverse relationship between firm risk and the use of contingent pay. Their results indicate that organizations facing higher firm risk relegate lower proportions of total pay to bonuses.

In short, an impressive amount of evidence based on widely divergent organizational samples, employee populations, and measures indicates that it is less efficient to rely on incentives as a control mechanism under conditions of high performance uncertainty. Building on this research, we accept the view that principals should not transfer compensation risk to agents under low instrumentality conditions (that is, a weak connection between agent efforts and observed outcomes). However, we propose that the relationship between performance uncertainty and compensation risk is not monotonically negative. Rather, we hypothesize that compensation risk bearing is concave with respect to firm performance uncertainty in such a way that, with both high and low firm risk, transferring compensation risk to agents corresponds to lower firm performance. In the particular case of CEO pay, the subject of this study, we suggest that at various levels of firm risk, CEOs' behavior will have a differential impact on performance outcomes: instrumentality is weak not only when firm risk is high but also when firm risk is low, and it is likely to be stronger when firm risk is moderate. The case for deemphasizing performance-contingent pay when firm risk is high has already been made, so we focus our attention here on the lower and moderate firm risk conditions.

The calculus of agency theory suggests that several attributes militate against the transfer of compensation risk to CEOs in firms with low risk. Because outcome uncertainty and cause-effect ambiguity are low, rewarding CEOs for predictable firm-level results that are largely disassociated from strategic choices (Powell, 1992) makes little sense. Because the environment, technology, and organizational transformation processes are relatively stable, these firms should place more emphasis on historical precedents, accepted procedures, traditions, and compliance with industry norms (Galbraith, 1973; Miller & Shamsie, 1996; Priem, Rasheed, & Kotulic, 1995) so that executive actions are more readily programmed and monitored (Kerr, 1985). In other words, the more ex ante information about outcomes that is available, and the clearer the causes and effects of behaviors, the less rational it would be to rely on outcomes as a surrogate measure for the contributions of an agent's efforts (Eisenhardt, 1985).

Managers in low-risk firms are also less likely to need stimulation for risk seeking. Such stimulation may be counterproductive, as riskier decisions may jeopardize the firm's normal returns extracted from a stable market domain, insulated from major environmental jolts and discontinuities (Rajagopalan, 1997; Thompson, 1967). Furthermore, as Wright, Ferris, Sarin, and Awasthi (1996) noted, risk taking is most relevant for firms with growth opportunities, and these opportunities are limited among low-risk firms. In keeping with these findings, Wiseman and Bromiley (1996) suggested that low performance variability may indicate that agents have few opportunities to capitalize on high risk–high return strategies. Thus, "reinforcing corporate risk taking in the absence of genuine growth opportunities would be economically irrational" (Wright et al., 1996: 449). At a minimum, even if they were to do no harm, incentive alignment plans for these firms may not be efficient, as the firm would be providing a reward for firm-level performance results that would have been observed largely independent of executive effort. The firm may also have to pay a compensation premium to induce executives to accept performance-contingent pay when the opportunity to significantly improve performance outcomes beyond anticipated levels is low.

In contrast to those in high-risk settings, managers in settings with moderate risk should be able to share the uncertainty of performance outcomes with owners without bearing risk to such an extent that they are tempted to engage in risk reduction strategies prejudicial to shareholders (that is, the agency costs associated with risk bearing by risk-averse managers should be lower). Hence, managerial risk reduction is not so critical an element in the design of incentive mechanisms in moderate-risk firms as it is in high-risk firms. At the other end, risk sharing should be more meaningful in moderate-risk contexts than in low-risk contexts, since in moderate-risk settings there is sufficient variation in firm outcomes that CEOs stand to gain from significant improvements in those results. Such gains cannot occur when the base criteria for measuring firm performance remain relatively unchanged or stable. Thus, result-oriented approaches to managerial evaluation and rewards are more justifiable in moderate-risk settings and should exert a positive motivational impact because of the closer relationship between agent ef-

fort and organizational outcomes (the higher instrumentality that is present). In contrast, results are largely known ex ante in low-risk settings and thus may not be attributed to the executive in charge. By logical extension, when firm risk is moderate, it would be more efficient for principals to invest in contingent pay rather than in monitoring mechanisms, given the agents greater control over outcomes and better opportunities to effectively pursue high-return strategies.

To summarize our theoretical discussion so far, the degree of firm risk should exert divergent influences on CEO compensation risk bearing. At both lower and higher levels of firm risk, firms should deemphasize performance-contingent pay, while the opposite is likely to be true at a moderate level of firm risk.

Hypothesis 1. Reliance on performance-contingent pay for CEOs will be greater under conditions of moderate firm risk than under conditions of either low or high firm risk.

Gray and Cannella (1997) argued (although their empirical results did not confirm it) that high-risk firms should provide CEOs with greater total compensation, in effect making a linear prediction. In their words, "because increased firm risk means increased variability in performance outcomes, executives employed by high risk firms may require a risk premium as poor performance (regardless of cause) will be attributed to them" (Gray & Cannella, 1997: 519). Contrarily, on the basis of the logic underlying Hypothesis 1, we expected CEO total compensation to be greatest under conditions of moderate firm risk. That is, there should be a curvilinear relationship between total CEO pay and firm risk. Given that compensation risk bearing should be greatest under moderate firm risk conditions (that is, much of the compensation package will not be fixed or guaranteed but performance contingent), a CEO should be paid more under those conditions in exchange for accepting the higher compensation risk.

Thus, in keeping with traditional agency arguments, we expected to find that CEOs demand higher overall compensation in exchange for riskier compensation arrangements (Holmstrom, 1987; Jensen & Meckling, 1976; Osterman, 1992; Shavell, 1979). But, diverging from the predictions of Gray and Cannella (1996) that firm risk and compensation level should go up in tandem, we suggest that the principals of higher- and lower-risk firms offer lower compensation risk arrangements for CEOs, thereby offsetting the need to provide a risk premium to enable attraction and retention for highly qualified executives. The opposite is likely to be true toward the middle of the firm risk distribution, as CEOs may require higher pay in exchange for lower pay insurance.

Hypothesis 2. The relationship between CEO compensation level and firm risk is curvilinear, with CEO compensation higher under conditions of moderate firm risk than under either low or high firm risk.

So far, we have treated firm-level risk in a general way, as uncertainty in firm outcomes. Building on the CAPM (Sharpe, 1964), researchers have divided this uncertainty into two components, uncertainty that is idiosyncratic to a particular organization and uncertainty that can be attributed to environmental or macroeconomic forces (Kerr & Kren, 1992). The first risk component, known as unsystematic risk or epsilon, captures the degree of variation in a firm's performance (as reflected in its income stream or stock returns) that can't be explained by overall market trends. The second component, systematic risk or beta, captures the amount of variation in firm performance outcomes that mirrors concomitant changes taking place in the overall market.

We think that the hypothesized curvilinear relationship between performance-contingent CEO pay and firm risk will be stronger in the case of unsystematic firm risk than in the case of systematic firm risk. There are three interconnected reasons for this expectation under the agency logic discussed earlier. First, at any level of systematic risk, the efforts and activities of a focal CEO are more disassociated from performance outcomes than they will be in the case of unsystematic risk. CEOs of firms in the same industry tend to face the same systematic fluctuations in income and stock prices. Thus, performance instrumentality should be weaker in the case of moderate systematic risk than in the case of moderate unsystematic firm risk, because performance outcomes in the former are largely exogenous to agents' behavior. Reliance on performance-contingent pay would not make as much sense in the case of moderate systematic risk (in comparison with moderate unsystematic risk) given that performance resulting from macro economic fluctuation is largely beyond a CEO's sphere of influence. Second, use of performance-contingent pay makes less sense at any level of systematic risk (beta) not only because CEOs' impact on performance is weak, but also because its use increases the costs of securing the CEOs' services. This increased cost results from the need to pay a risk premium to these agents in exchange for their accepting a high proportion of variable pay. Lastly, observed performance variations provide less information about agent behavior

under moderate unsystematic risk than under moderate systematic risk for the reasons noted above, and thus incentive alignment is less meaningful and efficient as a substitute for direct monitoring in that context. Thus,

Hypothesis 3. The curvilinear relationship between the proportion of CEO pay that is contingent and firm risk is stronger in the case of unsystematic risk than in the case of systematic risk.

METHODS

The research used archival data collected from the CRSP, Execucomp, and COMPUSTAT databases. The initial data cover five years (1994–98) and all publicly traded Standard & Poor's (S&P) 500 firms. Only firms whose CEOs had held their jobs for at least three of the five years (441 firms) were included in the study. Firms ranged in size from 270 to 675,000 employees and represented ten broad industry groups, with from 10 to 30 firms represented in each industry. Another 18 observations were lost owing to missing data, leaving 423 firms in the sample.

Variables

Dependent. *Total CEO compensation* combined cash and noncash forms of income: salary, bonus, long-term incentive pay (LTIP), the value of stock options awarded, and all other pay. Contingent forms of pay (including cash bonuses, LTIP, and stock options) were lagged one year since these forms of pay are determined and awarded in the year following the year in which they are earned. We then summed these forms of pay annually and averaged them over the five-year study period (Murphy, 1986). Following prior research (e.g., Gray & Cannella, 1997) we measured performance-contingent compensation as *pay mix,* calculated as total variable pay (bonuses, LTIP, and stock option awards) divided by total pay. This ratio was averaged over the five-year period.

Independent. Following convention in the risk literature, we used four measures of firm risk: *systematic market risk (beta), unsystematic market risk (sigma), systematic income risk,* and *unsystematic income risk* (the latter two risk measures use return on assets [ROA] as the measure of firm income) (Miller & Bromiley, 1990). Both market-based measures of risk (beta and sigma) are taken from the CAPM, which was estimated using five years (1994–98) of monthly stock price and treasury bill data. The income risk measures were calculated similarly to the market risk measures, but with quarterly ROA replacing stock price in the model. In other words, quarterly firm ROA was regressed on the quarterly average ROA of all S&P 500 firms. The parameter estimate and error term from this model respectively become the measures of systematic and unsystematic income risk. Finally, to allow for comparison with prior research, we measured firm performance using *total stock returns* over the five years of the study. Total stock return includes the appreciation of stock price over the period plus dividends paid.

Control. In order to "partial out" the effect of potential correlates in the analysis, we controlled for firm size, firm degree of internationalization, CEO tenure, CEO equity ownership, equity ownership by the board of directors, and industry effects. *Size,* commonly used in most prior CEO pay studies, was measured as the logarithm of sales (Deckop, 1988). *Internationalization* has been shown to be a strong predictor of CEO pay since internationalization increases the complexity and therefore the information-processing and agency demands confronting CEOs (Sanders & Carpenter, 1998; see also Eisenhardt, 1989). This variable was measured by combining four indicators of the geographic breadth of a firm's operations. These indicators include the proportion of taxes paid to foreign governments, the proportion of revenues generated from foreign markets, the proportion of the firm's assets located abroad, and the number of geographic segments in which the firm competes. *CEO tenure* has been shown to influence CEO performance-contingent pay in prior research (e.g., Murphy, 1986). Increased CEO tenure may promote a principal's trust of an agent and the assumption that actions will be taken in the principal's interest (Murphy, 1986). Tenure was simply the number of years a CEO had held this position in the current firm. To separate the effects of CEO equity ownership from compensation effects (cf. Sanders, 2001), we included *CEO equity ownership* as a control, defining it as the portion of outstanding stockholder equity held by a CEO. Similarly, *director ownership* was the proportion of outstanding stockholder equity held collectively by the board of directors (omitting the CEO). These two forms of ownership align incentives, in that both agent and principal stand to lose if the agent fails to act on the principal's behalf (Amihud & Lev, 1981). Finally, our control for industry effects corresponds to a measure employed by Amburgey and Miner (1992). Employing an effects-coding procedure, we created ten indicator variables representing the ten industry sectors.

TABLE 1
Descriptive Statistics and Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11
1. Variable pay mix	0.75	0.19											
2. Total compensation	59.00	97.00	.36										
3. Systematic market risk	0.97	0.58	.13	.16									
4. Unsystematic market risk	14.02	6.36	.06	.11	.36								
5. Systematic income risk	0.84	2.45	−.12	−.01	−.03	.10							
6. Unsystematic income risk	2.57	2.77	−.00	.06	.16	.49	.18						
7. Size[b]	8.70	1.37	.20	.20	−.15	−.41	−.07	−.40					
8. Internationalization	0.52	0.36	.15	.11	.01	.10	−.10	.15	.00				
9. CEO tenure	7.69	6.92	−.11	.06	.08	.10	.04	−.04	−.10	−.05			
10. CEO ownership	10.46	29.01	−.16	.00	.07	.16	.12	.05	−.15	.02	.46		
11. Director ownership	0.22	0.34	.08	.17	−.10	−.06	−.09	.02	.18	.11	−.19	−.13	
12. Total stock returns, 1994–98	23.81	18.42	.22	.26	.28	.31	−.09	.19	−.06	.01	.05	.13	−.10

[a] $n = 423$. Correlations greater than .09 are significant at $p < .05$; those greater than .10 are significant at $p < .01$; and those greater than .14 are significant at $p < .001$.
[b] Logarithm.

Analysis

Aiken and West (1991) recommended centering all independent variables in a model prior to squaring terms used in testing curvilinear effects as a way to enhance the interpretation of interaction terms and to reduce potential collinearity between the conditional and interaction effects. Hence, we centered all independent variables to zero prior to creating the squared risk terms. Since the data were highly skewed, we also eliminated observations having undue influence on results through a procedure suggested by Judge, Hill, Griggeths, Lutkepohl, and Lee (1988). In this procedure, each model was estimated, and individual observations with residual values beyond four standard deviations from the mean residual or with unduly large influence on the parameter estimates were eliminated. This procedure reduces the possibility that a small number of extreme values will overly influence results. Since this procedure was done separately for each of the two models, we eliminated eight outliers from the model of pay mix and ten outliers from the model of total compensation.[1] Finally, we conducted several tests to account for possible violations of the assumptions of ordinary least squares (OLS) regression analysis. First, we calculated variance inflation factors to test for multicollinearity among the independent variables. We also used White's test to test for heteroskedastic errors. Both tests indicated no violations in our analysis.

[1] Results from estimating the model with outliers included (available from authors) are consistent with those reported here.

RESULTS

The correlation matrix and descriptive statistics for all variables appear in Table 1. All statistics are based on raw data prior to centering. Table 2 presents the variable pay mix results. Hypothesis 1 predicts that contingent pay will be a larger proportion of total compensation under conditions of moderate risk than under either low or high risk. As predicted, firm risk squared exhibits a statistically significant, negative association with pay mix (the proportion of variable pay) for both measures of unsystematic risk, explaining between 2 and 3 percent of additional variance. Figure 1 graphs the association between the proportion of variable pay and unsystematic risk. However, we found no association between risk and pay mix for either of the systematic measures of risk. Hypothesis 1 is supported for unsystematic risk only.

Table 3 presents the results of our tests of Hypothesis 2, which predicts that compensation is highest for CEOs in moderate-risk firms. Consistent with prediction, firm risk squared exhibits a significant, negative association with total pay for both measures of unsystematic risk. This concave downward association explains from 1 to 2 percent of the variance in total compensation beyond that explained by the monotonic association. Figure 2 graphs the association between total CEO compensation and unsystematic firm risk. Neither measure of systematic risk exhibited the predicted association with total compensation. Like Hypothesis 1, Hypothesis 2 is supported for unsystematic risk, but not for systematic risk.

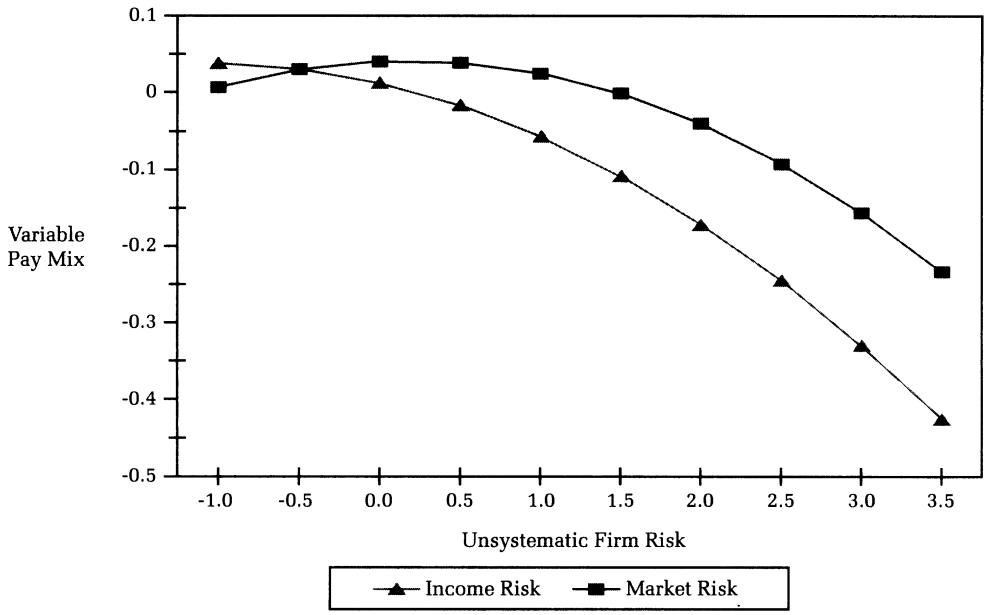
The association between performance-contingent pay and unsystematic risk but not systematic risk

TABLE 2
Results of Regression Analysis for Variable Pay Mix[a]

Independent Variable	Base Model	Systematic Market Risk		Unsystematic Market Risk		Systematic Income Risk[b]		Unsystematic Income Risk[b]	
Size	.15** (2.41)	.19** (3.01)	.18** (2.92)	.19** (2.90)	.21** (3.25)	.15** (2.36)	.14** (2.27)	.17** (2.62)	.21*** (3.27)
Internationalization	.15** (2.75)	.13** (2.49)	.13** (2.50)	.13*** (2.51)	.12** (2.32)	.15** (2.74)	.15** (2.82)	.14** (2.64)	.14** (2.56)
CEO tenure	−.07 (−1.38)	−.07 (−1.45)	−.07 (−1.45)	−.07 (−1.42)	−.06 (−1.27)	−.07 (−1.40)	−.07 (−1.42)	−.06 (−1.31)	−.06 (−1.14)
Director ownership	.07 (1.55)	.07 (1.54)	.07 (1.64)	.06 (1.36)	.05 (1.22)	.07 (1.53)	.07 (1.53)	.07 (1.46)	.07 (1.61)
CEO ownership	−.19*** (−3.75)	−.18*** (−3.75)	−.18*** (−3.77)	−.19*** (−3.94)	−.20*** (−4.03)	−.18*** (−3.67)	−.18*** (−3.70)	−.19*** (−3.76)	−.19*** (−3.84)
Total stock returns, 1994–98	.33*** (7.24)	.30*** (6.67)	.31*** (6.71)	.30*** (6.43)	.29*** (6.29)	.32*** (6.84)	.32*** (6.89)	.32*** (7.11)	.31*** (7.00)
Firm risk		.15*** (3.17)	.16*** (3.27)	.11** (2.04)	.27*** (4.05)	−.02 (−0.46)	−.01 (−0.31)	.05 (1.04)	.26*** (3.65)
Firm risk squared			−.04 (−0.79)		−.23*** (−3.77)		−.04 (−0.88)		−.25*** (−3.99)
Adjusted R^2	.25***	.27***	.27***	.26***	.28***	.25***	.25***	.25***	.28***
Change in adjusted R^2		.02*	.00	.01	.02*	.00	.00	.00	.03*
n	415	415	415	415	415	415	415	415	415

[a] Standardized regression coefficients are shown, with t's in parentheses.
[b] Income was measured as ROA.
* $p < .05$
** $p < .01$
*** $p < .001$

FIGURE 1
Model of Variable Pay Mix[a]



[a] Unsystematic firm risk values are *Z*s.

reported above (Hypothesis 1) provides initial corroboration for Hypothesis 3, which predicts that unsystematic forms of risk will exhibit a stronger association with pay mix than systematic forms of risk. To formally test this hypothesis, we calculated a *t*-test using the confidence interval surrounding unsystematic risk to determine whether systematic risk was significantly different from unsystematic risk (Cohen & Cohen, 1983). This was done separately for market and income forms of risk. Our results indicate that systematic market risk is significantly different from unsystematic market risk ($t = 4.12$, $p < .001$) and that systematic income risk is significantly different from unsystematic income risk ($t = 4.68$, $p < .001$) in the model of pay mix. These findings strongly support Hypothesis 3.

CONCLUSIONS AND DISCUSSION

This study suggests that CEO pay design varies according to the degree of risk facing a firm and that this association between firm risk and CEO pay is stronger for firm-specific (unsystematic) risk than for market-driven (systematic) risk. Our findings support this view and extend recent research on executive pay showing that the appropriateness of CEO pay strategies depends on their fit to the unique conditions facing each firm. The overwhelming conclusion of this and preceding studies is that a more fruitful avenue to pursue in the search for links between CEO pay and performance is to search for those idiosyncratic conditions in which particular CEO compensation strategies appear to work best.

We extend prior research by finding that low risk, like high risk, corresponds to a deemphasis on incentive pay. That is, we found evidence of a concave association between firm-specific forms of risk and the allocation of variable pay in CEO pay schemes. This finding supports our view that at low levels of firm risk, it may be less meaningful to provide increased incentives since CEO efforts to influence firm outcomes may be inefficient (Eisenhardt, 1985; Miller & Shamsie, 1996) or ineffectual (Powell, 1992). In addition, the stronger findings associated with unsystematic risk (vis-à-vis systematic risk) further support the notion that risk sharing is less desirable when performance outcomes are driven by exogenous noncontrollable factors, such as business cycle effects.

The curvilinear association between unsystematic risk and pay mix (the proportion of contingent pay) also suggests a ceiling effect on agent risk bearing. That is, beyond some level of unsystematic firm risk, the proportion of contingent pay falls. This finding indicates that a trade-off occurs between compensation-induced risk (increasing the proportion of contingent pay) and firm-specific induced risk. At high levels of unsystematic firm risk, contingent pay is lower, corresponding to a lower potential compensation risk but also, more importantly, to reduced upside potential returns to CEOs.

TABLE 3
Regressing Average Total Compensation on Risk[a]

Independent Variable	Base Model	Systematic Market Risk		Unsystematic Market Risk		Systematic Income Risk[b]		Unsystematic Income Risk[b]	
Size	.35*** (6.63)	.39*** (7.30)	.39*** (7.22)	.44*** (7.95)	.45*** (8.08)	.36*** (6.71)	.37*** (7.06)	.42*** (7.64)	.45*** (8.14)
Internationalization	.23*** (4.48)	.21*** (4.16)	.21*** (4.16)	.20*** (4.05)	.20*** (3.96)	.23*** (4.50)	.21*** (4.10)	.21*** (4.09)	.20*** (3.97)
CEO tenure	.02 (0.46)	.02 (0.40)	.02 (0.40)	.02 (0.44)	.02 (0.53)	.03 (0.54)	.03 (0.58)	.03 (0.70)	.04 (0.85)
Director ownership	.02 (0.40)	.02 (0.48)	.02 (0.47)	.00 (0.02)	−.00 (−0.03)	.02 (0.45)	.02 (0.42)	.00 (0.09)	.01 (0.21)
CEO ownership	−.06 (−1.31)	−.06 (−1.26)	−.06 (−1.26)	−.08* (−1.79)	−.09* (−1.81)	−.07 (−1.43)	−.06 (−1.30)	−.06 (−1.33)	−.06 (−1.34)
Total stock returns, 1994–98	.40*** (9.09)	.38*** (8.54)	.38*** (8.49)	.35*** (7.75)	.34*** (7.68)	.42*** (9.02)	.40*** (8.80)	.39*** (8.84)	.38*** (8.76)
Firm risk		.17*** (3.56)	.17*** (3.46)	.23*** (4.64)	.30*** (4.48)	.05 (1.06)	.02 (0.45)	.19*** (3.89)	.36*** (5.15)
Firm risk squared			.00 (0.04)		−.09* (−1.67)		.16*** (3.78)		−.20*** (−3.36)
Adjusted R^2	.28***	.30***	.30***	.32***	.32***	.28***	.31***	.31***	.33***
Change in adjusted R^2		.02*	.00	.04*	0	0	.03*	.03*	.02*
n	413	413	413	413	413	413	413	413	413

[a] Standardized regression coefficients are shown, with t's in parentheses.

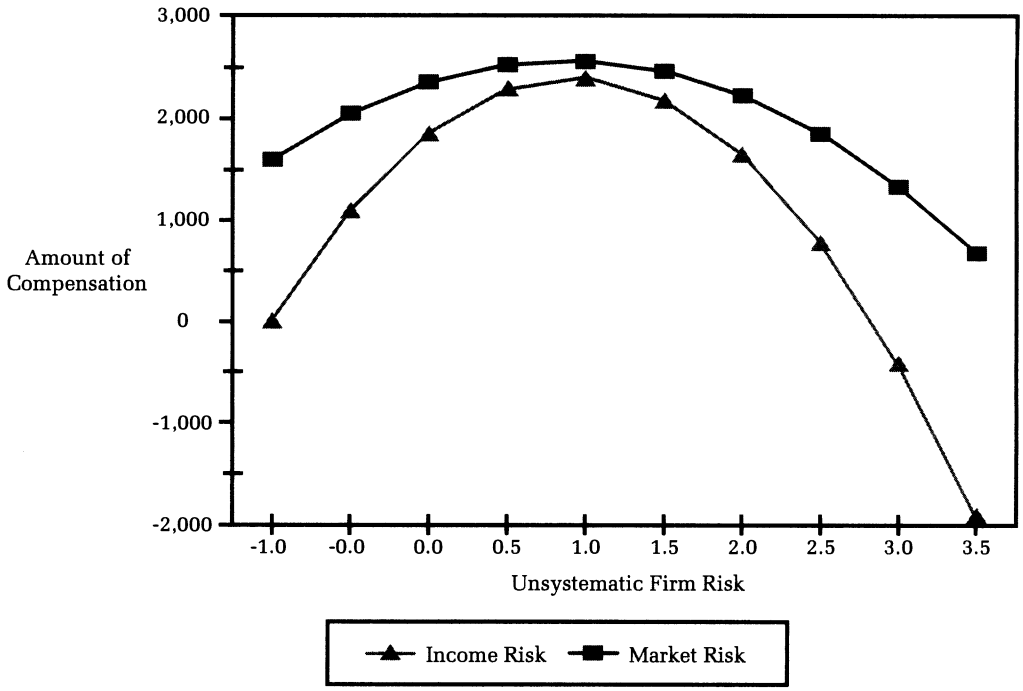
[b] Income was measured as ROA.

* $p < .05$

** $p < .01$

*** $p < .001$

FIGURE 2
Model of Total Compensation[a]



[a] Unsystematic firm risk values are *Z*-scores.

As further evidence of a reduced upside potential for CEOs, a curvilinear association between unsystematic risk and total compensation—the same forms of risk associated with differences in pay mix—was found. The relative decline in total pay over the area of high unsystematic risk suggests that CEOs are more likely to be compensated for actual compensation risk than they are for firm-specific risk. This is reasonable to the extent that pay is decoupled from firm performance under conditions of high unsystematic risk (as was found here), so that CEOs are rewarded with greater pay insurance. This finding challenges previous conclusions that the amount of pay is linearly tied to firm risk—especially unsystematic forms of risk—and represents a fundamental extension to earlier research by indicating that CEO compensation is highest under conditions of moderate, unsystematic risk (that is, where variable pay mix is also highest).

Conversely, we found a positive association between systematic market risk and total compensation such that firms pay more for bearing systematic market risk. This association suggests that CEO total compensation may increase with systematic market risk because of the negative effects that poor performance outcomes have on employment security, reputation, and future earnings (Walsh & Seward, 1990). In contrast to firm-specific unsystematic risk, systematic market risk reflects exogenous determinants of performance volatility. Thus, CEOs may be awarded risk premiums for exposure to environmentally driven firm performance fluctuations that lie beyond their control.

The general conclusion we draw from the theoretical framework and findings of this study is that organizations transfer pay risk to their CEOs whenever this transfer appears to have the potential to improve performance outcomes—that is, when there is moderate, unsystematic firm risk. When outcomes are largely beyond the control of the CEOs (when unsystematic firm risk is high or low or when exogenous market forces prevail), risk sharing is likely to be dysfunctional, as the observed performance results cannot be unambiguously attributed to CEO decisions. This pattern is consistent with the predictions that can be drawn from most motivation theories, particularly expectancy theory, in that a reward can only induce desired behaviors if the individual can exert some influence on the criteria used to trigger the reward.

Our study indicates that agency predictions regarding risk transfer from principal to agent are robust if we take into account the ability of the agent to influence the outcome criteria desired by the principal. When this instrumentality of agent actions on observed outcomes is weak, increased agent risk bearing would probably be dysfunctional to principals by offering perverse incentives to ex-

ecutives to pursue gaming strategies in their efforts to exert maximal influence on what they can control (for examples, see Ahimud and Lev [1981] and Baysinger et al. [1991]).

Alternatively, McClelland's (1961) theory of needs provides another perspective for interpreting our results. In his model, high achievers avoid what they perceive to be very easy or very difficult tasks (which represent low or high unsystematic firm risk) and prefer the challenge of tasks in which they have personal responsibility for success or failure (which represent moderate unsystematic firm risk situations).

Finally, this study also raises questions about how different forms of risk may influence compensation. Like previous researchers, we found that idiosyncratic firm risk appears to have a stronger influence than exogenous market risk on compensation design (Bloom & Milkovich, 1998; Gray & Cannella, 1997), although we also found that the unsystematic risk effect on performance-contingent pay is concave rather than linear. This observation raises questions about how executives and principals view different forms of risk when negotiating the design of executive compensation. Though they have previously been largely ignored in the finance literature (see Fama and French [1995] for an exception), the implications for executive and firm behavior arising from differences between these types of risk have recently begun to come under strategy scholars' scrutiny (e.g., Chatterjee, Lubatkin, & Schulze, 1999). Clearly, this is an area ripe for future research and theorizing.

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