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THE COSTS AND BENEFITS OF MANAGERIAL INCENTIVES AND MONITORING IN LARGE U.S. CORPORATIONS: WHEN IS MORE NOT BETTER?

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Recent research and public discourse on executive compensation and corporate governance suggests a growing consensus that firms can and should increase their control over top managers by increasing the use of managerial incentives and monitoring by boards of directors. This study departs from this consensus by offering an alternative perspective that considers not only the benefits, but also the costs of both incentives and monitoring in large corporations. The study develops and tests a contingency cost/benefit perspective on governance decisions as resource allocation decisions, proposing how and why the observed levels of managerial incentives and monitoring may vary across organizations and across time. Specifically, the study suggests that: (1) firms that are more risky face greater costs when using incentive compensation contracts for top managers, thus reducing the expected level of incentive compensation use for such firms; (2) firms facing this problem of low incentive compensation use can realize greater benefits from higher levels of board monitoring, and thus are likely to rely more on board monitoring; and (3) firms with more complex corporate strategies face higher costs in using board monitoring, and are thus likely to rely less on board monitoring as a source of controlling top management behavior. The study also proposes that within this contingency perspective there may be diminishing 'behavioral returns' to increases in monitoring and incentives. These hypotheses are tested using extensive longitudinal data from over 400 of the largest U.S. corporations. The supportive findings suggest that maximal levels of incentives and monitoring are not necessarily optimal, and that a firm's strategy may not only have significant product/market implications, but also corporate governance implications.

Research on the control of modern corporations has increased dramatically in recent years, as the recent strategy and organizational research on topics such as executive compensation and corporate governance suggests (cf. Davis, 1991; Eisenhardt, 1989; Finkelstein and Hambrick, 1988; Kerr and Kren, 1992). Much of this research uses agency (Jensen and Meckling, 1976), managerialist (Berle and Means, 1932; Marris, 1964) and/or political (Wade, O'Reilly, and Chandratat, 1990) perspectives as its basis

or point of departure. Interestingly, despite such differing disciplinary orientations among researchers in this area, there appears to be a growing consensus that corporations can and should increase their control over top managers by increasing the use of managerial incentives and monitoring by boards of directors.

In some research-based and policy-directed analyses of executive compensation, for example, firms that provide heavy incentive-based compensation for top executives are considered exemplars to be imitated, while those firms relying less on incentive compensation are singled out for criticism (Jensen and Murphy, 1990b). Similarly, in research-based and policy-directed discussions

of corporate governance (e.g., Lorsch and MacIver, 1989), firms whose boards are structured in ways that suggest more vigilant monitoring of top management behavior are generally viewed as having superior internal control practices than firms having lower levels of monitoring. Not surprisingly, given the apparent benefits of greater incentive compensation and board monitoring, any observed variation across firms in the level of incentive compensation and monitoring is typically presumed to be due to political actions by influential top managers.

However, this study suggests that the emerging consensus for greater use of incentive compensation and board monitoring may be premature. In particular, while advocates are typically explicit in detailing the potential benefits of such practices, there is less willingness to consider explicitly the potential *costs* of such practices for firms. This study seeks to redress this imbalance by suggesting that (1) there are indeed costs associated with the heavy use of incentive compensation and board monitoring, (2) these costs (and benefits) vary predictably across organizations and across time as a function of several individual and organizational contingencies, (3) there may be diminishing 'behavioral returns' to increases in incentives and monitoring (stemming from reduced internal and external salience of such increases), and (4) these contingencies and diminishing returns can explain, in part, the variation in the observed use of incentive compensation and board monitoring in modern corporations.

There are very few efforts at examining empirically the notion that there are costs to incentives or monitoring. One recent (partial) exception is Beatty and Zajac (1994), who draw from agency theory to explore the costs of using incentive compensation. Using data from a large sample of firms about to go public, they find evidence consistent with their argument that more risky firms face greater difficulties (and thus greater costs) when using incentive compensation contracts, given the risk aversion of top managers, and as a result are less likely to emphasize incentive compensation. They also find that firms generally respond to this problem of inadequate incentive compensation by structuring boards of directors to provide greater levels of monitoring.

The present study also seeks to explain variation in firms' use of incentive compensation and monitoring. However, in addition to considering how differences in firms' riskiness may affect the cost of using incentive compensation for top managers, we also propose how additional organizational contingencies, such as the differential complexity involved in the pursuit of specific corporate strategies, may affect the costliness of using board monitoring to control top management behavior.[1] Finally, we also propose that within this contingency perspective the benefits of incentives and monitoring are essentially a function of their behavioral salience—both to the manager and external stakeholders—and that this salience may be realized at relatively low levels. Thus, we propose that there may be considerable diminishing 'behavioral returns' to increases in monitoring and incentives, such that the contingent relationships may be more logarithmic than linear. Empirically, we examine the proposed contingency relationships using longitudinal data over 5 years from a sample of over 400 of the largest U.S. corporations. By seeking to explain and predict why incentive compensation contracts and board-monitoring structures differ across organizations (rather than the typical research approach of treating them as exogenous), the study hopes to contribute to the growing literature on top management compensation, ownership, and corporate governance.

COSTS AND BENEFITS OF USING INCENTIVES TO CONTROL TOP MANAGEMENT

Managerialist theory has long been fundamentally concerned with the separation of ownership and control of large U.S. corporations (Berle and Means, 1932). In this literature, top managers are viewed as essentially running corporations for their own benefit, rather than the benefit of stockholding owners. It is therefore not surprising that early formulations of agency theory (e.g., Jensen and Meckling, 1976) originally defined the magnitude of the agency problem in terms

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[1] Beatty and Zajac (1994) only emphasized how the cost of incentives differed across firms (i.e., cross-sectionally), and focused on IPO firms, which are typically smaller and younger than the firms studied here. They also did not examine the possibility of diminishing returns to incentives and monitoring.

of the degree of separation between owner and manager interests. However, subsequent clarifications suggest that the use of incentive compensation to align owner and manager interests is potentially a double-edged sword. Specifically, linking a manager's compensation too closely to firm wealth might lead to risk-avoiding behavior on the part of the agent (the point where a linkage becomes 'too close' remains unclear, however).[2]

This argument, summarized in Holmstrom (1987) and in other normative principal–agent research, stresses the fact that while contingent compensation may seem to have desirable incentive/motivational properties (relative to noncontingent forms of compensation), it also can cause a manager to bear risk that could be more efficiently borne by diversified stockholders. The manager, unlike the owners, has already invested most of his/her nondiversifiable and nontradeable human capital in the firm; in this way, the agent can be treated as risk averse and the principal as risk neutral. It follows that agents would be reluctant to bear this risk of firm performance or, stated differently, that it is difficult and costly for the principal to have the agent bear this risk (this argument for managerial risk aversion does not require owners to be fully risk neutral, but only that managers be more risk averse than owners).

This suggests the need to (1) recognize explicitly the potential *costs*, rather than just the benefits, of using incentives, and (2) start to identify the organizational and individual contingencies that could affect the consideration of the incentive cost/benefit trade-off.[3] We begin by focusing on one such organizational contingency, i.e., firm risk, that may increase the riskiness of incentive compensation contracts, and therefore may make managers particularly reluctant to accept such contracts. In other words, differences in firm risk are associated with differences in the cost

of using incentive compensation, since it can influence managers' willingness to accept compensation contracts that include a risk-bearing component (Beatty and Zajac, 1994).

Thus, from an agency perspective, managers in risky firms may be particularly reluctant to accept substantial long-term incentives (LTIs) in their compensation contracts, and one can hypothesize a negative relationship between firm risk and the use of long-term incentives. We propose further, however, that several behavioral factors may affect the precise nature of this relationship. First, from a goal-setting perspective (cf. Locke *et al.*, 1981), compensation in the form of long-term incentive grants are intended to motivate CEOs by providing relatively specific performance goals that can direct their attention and effort. This suggests that the increased salience to a CEO from greater LTI compensation, and the resultant changes in his/her 'cognitive' attention and motivation, may be greatest when changing from zero or a very small level to a modest level of LTI compensation, as compared to changing an equal amount from an initially high level. In other words, there may be diminishing 'behavioral returns' insofar as such compensation increases cognitive motivation at a decreasing rate.

Second, the issue of salience suggests that there may also be diminishing 'behavioral returns' to increases in incentive compensation that are more external than internal in origin, deriving from social, as opposed to cognitive, factors. Specifically, from an institutional perspective, LTIs have become accepted and essentially *expected* components of CEO compensation contracts. In fact, Westphal and Zajac (1994) and Zajac and Westphal (1995) found evidence that LTIs (and the agency logic supporting them) have become 'institutionalized' over time as legitimate and socially expected mechanisms of incentive alignment (Zucker, 1983). Thus, while CEOs may generally prefer to avoid heavy long-term incentive compensation (particularly where firm risk is high), the increased external salience of observing some form of CEO incentive compensation may compel firms to provide minimal or 'token' long-term incentive grants as a symbolic gesture of commitment to shareholder interests (Westphal and Zajac, 1994). Note that from this perspective (Meyer and Rowan, 1977), the external salience (and hence the benefits) of

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[2] This difference in emphasis can be seen in Jensen's (1983: 334–335) suggestion that there are two 'almost entirely separate' agency literatures: a normative principal-agent literature that emphasizes the design of compensation contracts with optimal risk-sharing properties (Holmstrom, 1979; Levinthal, 1988), and a positive, empirically based, agency literature on the separation of corporate ownership and control (Fama and Jensen, 1983; Morck, Shleifer, and Vishny, 1989; Weisbach, 1988).

[3] Lambert and Larcker (1987: 85–86) also note that while compensation contracts are thought to be functions of 'characteristics of the manager, the firm, and the environment,' most compensation studies can be criticized for taking the form of compensation contracts as simply given.

showing that the firm is conforming to normative compensation practices can be achieved at lower levels of incentive compensation; thus, one can say that there are diminishing behavioral returns to increases in incentive compensation.

Taken together, the micro- and macro-behavioral arguments noted above suggest a modification of the negative linear relationship between firm risk and the use of LTIs. Specifically, as risk increases, the use of LTIs may decrease at a diminishing rate. These arguments suggest the following hypothesis:

> *Hypothesis 1: Firm risk will be negatively and logarithmically related to the use of LTIs; i.e., as firm risk increases, the use of LTIs will decrease, but at a diminishing rate.*[4]

Since the notion of financial incentives theoretically encompasses *all* financial rewards that are contingent on firm performance, the next two hypotheses extend the notion of incentives to include not only contingent compensation, such as executives' LTIs, but also the change in value of the managers' equity holdings, which of course also varies with firm performance (Jensen and Murphy, 1990a). This represents a more complete calculation of a manager's income that is 'at risk,' i.e., directly related to a firm's equity value.

From the risk-bearing perspective developed earlier, this suggests the need to test two additional hypotheses related to Hypothesis 1: namely, that CEOs in more risky firms will have (1) a lower level of equity holdings in their firms, and (2) a smaller proportion of noncash incentives (i.e., incentive compensation from LTIs plus changes in equity value based on stock ownership) relative to their total wealth change (i.e., noncash incentives + cash compensation). Moreover, the logarithmic relationship between risk and long-term incentive compensation proposed in Hypothesis 1 should also apply in these relationships. Thus, we hypothesize that:

> *Hypothesis 2: Firm risk will be negatively and logarithmically related to CEO equity holdings; i.e., as firm risk increases, CEO equity holdings will decrease, but at a diminishing rate.*

> *Hypothesis 3: Firm risk will be negatively and logarithmically related to the portion of a CEO's total wealth change comprised of noncash incentives; i.e., as firm risk increases, noncash compensation as a proportion of total compensation will decrease at a diminishing rate.*

The discussion thus far has treated compensation and wealth change from equity holdings as endogenous managerial choices. However, we also consider the possibility that equity ownership is more 'sticky' than compensation, and thus treat it as an independent variable, rather than as a variable whose level is simultaneously determined with the compensation variable.[5] Thus, the earlier discussion of risk-bearing implies another related hypothesis: namely, that the magnitude of the existing equity positions held by CEOs may influence their willingness to accept further risk-bearing (e.g., long-term incentive compensation) in their compensation contracts. This argument is consistent with the previous discussion of risk-bearing and incentives, but with an added emphasis on the specific differences in risk exposure facing CEOs holding varied amounts of equity in their firms (Beatty and Zajac, 1994). In other words, whereas the earlier hypotheses considered how an organizational, firm-specific contingency (i.e., firm risk) can affect compensation contracts, the following hypothesis considers an individual, CEO-specific contingency (i.e., CEO equity holdings). The hypothesis can be stated as follows:

> *Hypothesis 4: CEOs having larger equity stakes in their firms are likely to have less long-term incentive compensation in their compensation contracts,* ceteris paribus.[6]

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[4] As will be shown, our analysis is not limited to LTIs. Also, the precise operationalization of LTIs is discussed in the Measures section.

[5] While we recognize that it is possible to consider firm risk as ultimately an endogenous variable, we view risk as likely to be more exogenous and stable over time than compensation contracts, which can be easily and quickly modified. Empirically, we also address this issue by lagging our measures of firm risk when predicting the use of incentive compensation (see later discussion).

[6] The same hypothesis is also suggested by another explanation that is consistent with our study; namely, that firms whose top managers have low equity positions face a more severe agency incentive problem, making it more likely that such firms will need to use LTIs in their executive compensation contracts. Such an explanation considers only the incentive component of the agency problem, rather than the incentive and risk-bearing components addressed in the present study.

COSTS AND BENEFITS OF USING MONITORING TO CONTROL TOP MANAGEMENT

Monitoring is a central concept in both the normative and positive agency literatures (Jensen, 1983). The former examines abstractly the role (and costs) of monitoring where optimal compensation contracts cannot be written, while the latter discusses the 'monitoring technology' observed in modern corporations (e.g., Fama and Jensen's, 1983, discussion of boards of directors). In fact, Jensen and Meckling's (1976: 312) original discussion of agency costs begins with an analysis of the problems that arise, and of the value of monitoring, when a 100 percent owner/manager reduces his/her equity holdings to 95 percent. From this perspective, agency costs exist wherever there is no single 100% owner/entrepreneur bearing the full cost of his/her actions, and these costs increase as top management equity ownership decreases. Thus, both literatures generally stress the primacy of incentive contracting as a 'first best' solution to the agency problem, and emphasize that the optimal level of monitoring would be based on the magnitude of the incentive gap between principal and agent (Beatty and Zajac, 1994).

The question of what level of monitoring should be provided is based, of course, on the premise that monitoring has costs; otherwise, all rational firms would monitor maximally, irrespective of the strength of incentive compensation contracts or other factors. There is virtually no research, however, that attempts to distinguish how the costs and benefits of board monitoring may differ across organizations, and how such differences may predict variation in the level of monitoring one would expect to observe. We propose that there are at least two organizational contingencies that can affect the expected level of monitoring of top managers by boards of directors: (1) the degree to which the firm uses incentive compensation; and (2) the complexity of a firm's corporate strategy. We discuss each of these in turn.[7]

Incentives and monitoring

This organizational contingency follows directly from the normative agency literature's discussion of monitoring, as noted briefly above. Specifically, a higher level of monitoring by boards of directors would be required in the case where a manager does not accept any compensation risk that is tied to firm performance, relative to the case where a manager's compensation is tied to the performance of the firm. In other words, the benefits of heavy monitoring are particularly evident in situations where managerial incentives are only weakly tied to firm performance. Thus, the desired level of monitoring is contingent on the magnitude of the incentive aspect of the agency problem.

Firms may employ a number of governance design features to increase the level of monitoring of top management by the board of directors.[8] One governance design issue involves the proportion of outside directors on the board. Fama (1980) and Fama and Jensen (1983) view outside directors as professional referees and experts in internal organizational control. Even if one disputed this characterization of outside directors and viewed them instead as often coopted by top management (Wade *et al.*, 1990), a heavy use of insider directors still suggests relatively weak monitoring. Since insiders are 'beholden to CEOs for their jobs' (Fredrickson, Hambrick, and Baumrin, 1988: 262) they may be more willing to accommodate CEO preferences regarding compensation arrangements. Insider-dominated boards imply problematic self-monitoring, and particularly weak monitoring of the CEO, since the CEO is likely to be in a position to influence an inside director's career advancement within the firm. In general, agency theorists and advocates of board reform typically assume that outside directors will be less conciliatory toward CEOs (Beatty and Zajac, 1994; Schellenger, Wood, and Tashakori, 1989).

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[7] Clearly, these are not the only possible contingencies that can affect the cost or benefit of board monitoring in organizations, nor are they necessarily the most relevant. Given the lack of prior research on this subject, however, there is no precedent upon which one can rank such contingencies.

[8] The degree to which boards of directors are effective monitors of top management has been the subject of continued debate (cf. Fama, 1980; Fama and Jensen, 1983; Lorsch and MacIver, 1989; Mace, 1971). However, an assumption of fully effective board monitoring is not needed for the present study, given that our interest is focused not on absolute levels of monitoring, but rather on explaining *differences* in firms' level of monitoring, as predicted by differences in the costliness of such monitoring.

A second mechanism for dealing with this monitoring problem is to choose outside directors who also hold equity interests in the firm. Outside directors who are also owners would seem likely to be more vigilant in their monitoring role (Morck, Shleifer, and Vishny, 1988). The logic of vigilant monitoring based on ownership interest can be extended to a third mechanism for monitoring: the presence of a shareholder with large equity holdings who, for whatever reason, is *not* on the board (i.e., a 'blockholder') (Huddart, 1993). Such large-scale owners are more likely to be keen monitors of managerial behavior.

A fourth potential mechanism for ensuring adequate monitoring involves choosing whether the CEO should also serve as chairman of the board of directors. The presence of an outside board chairman who is not also CEO can represent an additional monitor of managerial behavior. In fact, recent calls for changes or reforms in corporate governance structure have emphasized the importance of the increased monitoring afforded by the separation of CEO and chairman roles (Lorsch and MacIver, 1989). In summary, then, one would expect a negative relationship between the magnitude of the agency incentive problem (defined first as the level of CEO equity ownership in the firm) and the level of monitoring provided by the firm.

However, the nature of the negative relationship may be more complex. Specifically, as was argued in the prior discussion of the diminishing 'behavioral returns' to incentives, there may also be diminishing returns to increased levels of monitoring. For example, if the desired purpose of monitoring is to make the act of monitoring salient for the CEO, rather than actually to monitor CEO behavior, than the desired level of monitoring is that which 'gets the CEO's attention.' Firms with an already high level of monitoring are likely already to have made monitoring salient to a CEO, and are therefore likely to find further increases in monitoring less beneficial than firms with low or nonexistent monitoring activity whose CEOs' cognitive awareness of monitoring is much lower.

In addition to this cognitive perspective, there may be more sociopolitical and institutional reasons why there are diminishing behavioral returns to increases in monitoring. First, given that CEOs are likely to resist increases in

monitoring that reduce their autonomy and discretion, firms already monitoring a substantial amount may be disinclined to increase board monitoring further.[9] Firms with very low levels of monitoring (particularly those with lower levels of CEO incentive compensation), on the other hand, may feel socially obligated to show some increase in board monitoring as a symbolic gesture of commitment to shareholder interests (Westphal and Zajac, 1994).

This argument implicitly assumes that monitoring structures, as well as incentive compensation arrangements, have symbolic value. Although little systematic empirical evidence exists regarding the 'institutional status' of various monitoring mechanisms, it would appear that shareholders routinely and somewhat reflexively advocate the addition of outside directors to the board and separation of the CEO and board chair positions (*Business Week*, 1994), among other changes. In effect, therefore, a substitution effect between incentives and monitoring exists in the domain of symbolic control (i.e., in terms of *managing shareholder perceptions* regarding the agency problem), as well as the domain of substantive control (i.e., in terms of *actually minimizing* the agency problem) (Pfeffer, 1981), and this symbolic trade-off function is nonlinear.

In summary, then, the expected relationship between the magnitude of the agency incentive problem (defined first as the level of CEO equity ownership in the firm, cf. Jensen and Meckling, 1976) and the level of monitoring can be phrased in terms of the following hypotheses, each corresponding to the specific governance mechanisms discussed above:

Hypothesis 5: CEO equity holdings in the firm are negatively and logarithmically related to the level of board monitoring, as represented by
   H5a: a larger percentage of outside directors
   H5b: a larger percentage of outside director stock ownership
   H5c: a major nonboard member blockholder

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[9] In fact, Finkelstein and D'Aveni (1994) argue that reducing the decision-making autonomy of CEOs by separating CEO and Board Chairman positions is 'a double-edged sword.'

H5d: separate CEO and Board Chairman positions.[10]

We can also extend the definition of the magnitude of the agency incentive problem to include not only CEO equity holdings but also the incentive component of CEOs' compensation contracts. Consistent with the earlier discussion, managers who have a lower proportion of their wealth change (i.e., through long-term incentives and equity stakes) contingent on firm performance create a more severe incentive problem for firms, which may be addressed by increasing the level of monitoring. Also, as noted above, the relationship may be nonlinear. This suggests the following related hypotheses:

Hypothesis 6: The proportion of CEO wealth change contingent on noncash sources will be negatively and logarithmically related to levels of monitoring, as represented by
  H6a: a larger percentage of outside directors
  H6b: a larger percentage of outside director stock ownership
  H6c: a major nonboard member blockholder
  H6d: separate CEO and Board Chairman positions.

Strategic complexity and monitoring

In an agency framework, the costs of monitoring can be considered in terms of overcoming information asymmetry. Agency problems typically emerge because of the two fundamental conditions that underlie principal–agent relationships: goal incongruence and information asymmetry (Zajac, 1990). Goal congruence is an assumed condition, without which the agency problem reduces to a more easily solvable contracting problem. The second dimension, information asymmetry, is a critical variable in the principal–agent relationship, and has generated a substantial body of research within the normative agency theory literature.

Information asymmetry refers to the fact that in the typical principal–agent relationship the principal has less information than the agent about (1) the

characteristics of the agent and (2) the decisions made and the actions taken by the agent. These two aspects of information asymmetry have been labeled formally in the agency theory literature as *adverse selection* and *moral hazard*, respectively. We focus (as does most of the governance literature) on the moral hazard problem, where the issue is whether boards of directors are able to adequately monitor or control the actions and decisions of self-interested CEOs.[11]

The present study proposes that corporate strategy can be an important contingency in predicting differences in monitoring costs across organizations. We suggest that some corporate strategies are generally more complex than others, and that complex corporate strategies are costlier for boards of directors to monitor. More specifically, we view the information asymmetry problem that boards of directors face as an increasing function of a firm's strategic complexity. While corporate strategies can be categorized in many different ways, one widely accepted characterization of a firm's strategy is its level of corporate diversification. In terms of complexity, we suggest that, *ceteris paribus*, boards of firms that are in only one industry are faced with less complexity than boards whose firms are active in multiple industries. A board member's ability to understand multiple industries well enough to adequately monitor a firm's top mnagement is likely to be limited, relative to the single business situation. Stated differently, the pool of director candidates possessing a sufficiently broad and complex 'cognitive map' to intelligently monitor top management is reduced in such firms (cf. Calori, Johnson, and Sarnin, 1994). and consequently the cost of finding, attracting and retaining sufficiently qualified directors is higher.

However, boards of firms at the highest levels of diversification, such as boards of conglomerate firms, may actually face less complexity, given that such firms tend to emphasize relatively straightforward financial oversight, in which differences across industries are deemphasized (Williamson, 1975). This suggests that the relationship between degrees of diversification and degrees of strategic complexity (and therefore the cost of monitoring) may become negative at the highest

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[10] As will be discussed, analyses are run separately for each measure of monitoring to assess whether the predictions of monitoring hinge on any single measure of monitoring, or are robust across measures.

[11] Zajac (1990) has examined adverse selection problems in CEO/board relationships, as well, in a discussion of CEO selection.

levels of diversification. In other words, there may be a curvilinear relationship between the level of diversification and the costliness of monitoring, such that the most complex corporate strategy, and thus the most difficult and costly situation for monitoring, exists in those firms pursuing a moderate level of diversification, where top management competes in multiple industries and seeks to capture the elusive 'synergies' across the divisions active in these different industries. This suggests the following hypothesis:

> *Hypothesis 7:   Firms deviating from intermediate levels of diversification are likely to have higher levels of monitoring, as represented by:*
> *H7a: a larger percentage of outside directors*
> *H7b: a larger percentage of outside director-owners*
> *H7c: a major nonboard member blockholder*
> *H7d: separate CEO and Board Chairman positions.*

METHOD

Sample and data collection

The population for this study includes the largest U.S. industrial and service firms, as listed in the 1987 *Forbes* and *Fortune* 500 indexes. Firms were excluded from the initial sample if proxy statements were unavailable, or if adequate compensation information was not provided in the statements. Firms were also excluded if complete data on board structure, diversification strategy, or firm performance were unavailable, yielding a final sample of 405 firms. *T*-tests revealed no significant differences in size (measured as sales and number of employees), performance (measured as market-to-book value and return on equity),or risk (measured as stock risk, accounting risk, or debt-to-equity ratio) between the initial and final samples.

Data were collected for the years 1987–1991 inclusive. Information on board structure, compensation and ownership was obtained from both proxies and Standard & Poor's *Register of Corporations, Directors, and Executives*. Data on CEO age were obtained from both Standard & Poor's and the *Dun and Bradstreet Reference Book of Corporate Management*. Data from Standard & Poor's COMPUSTAT service and the Center for

Resesarch in Security Prices (CRSP) were used to calculate performance, risk and size measures.

Measures

Firm risk

The first proxy for firm risk is the standard deviation of return on assets during the prior 10-year period ('*accounting risk*'). The second measure represents the standard deviation of the firm's weekly stock market returns during the same 10-year period ('*stock risk*'). Finally, the third measure of firm risk is the commonly used *debt-to-equity ratio*, calculated as total current and long-term debt divided by total common equity (Altman, 1968; Beaver, 1966). Analyses in this study will be run separately for each of the three measures of risk, thus showing whether the test of the relation between firm risk and the introduction of incentives is robust across measures.

Managerial incentives

Three measures of CEO compensation and ownership are used in the analyses. First, a continuous measure of *the proportion of CEO total compensation comprised of long-term incentive grants* was created. As mentioned earlier, LTI compensation includes grants of multiyear performance incentives, such as performance shares, performance units, and restricted stock (Jarrell, 1993). The measure is calculated as the value of CEO long-term incentives divided by total compensation (i.e., cash compensation plus the value of long-term incentives). Valuation formulas used for this calculation are discussed in detail in the Appendix.

We also used the dollar value of LTIs in our second measure of managerial incentives. Specifically, we calculated the natural log of the *percentage of CEO total compensation derived from noncash sources*. As discussed earlier, this captures the amount of a CEO's total income that is 'at risk' (i.e., it includes the dollar value of LTIs, as well as the gain/loss attributable to the shares of stock held by the CEO). This variable thus summarizes the incentive components of CEO total compensation that are directly related to equity value. The measure is constructed as follows: (the value of CEO long-term incentives + the change in value of stock held by the CEO for the year)/(cash compensation + the value of CEO

long-term incentives + the change in value of stock held by the CEO for the year).

While our including a CEO's wealth change attributable to his/her stock holdings as a component of a CEO's total incentive compensation is consistent with other comprehensive compensation studies (e.g., Jensen and Murphy, 1990a), one could, strictly speaking, consider such stock-based gains and losses as investment income. From an incentive/motivational standpoint, however, we believe that top managers' compensation and shareholding gains, when taken together, represent a more complete calculation of a CEO's wealth that is 'at risk,' i.e., directly related to a firm's equity value. Since there is no consensus on this issue of how narrowly vs. broadly incentives should be defined (cf. Lambert and Larcker, 1987: 93), it is important to note that the present study assesses incentive compensation both ways, i.e. excluding and including incentives from equity shares held (Hypotheses 1 and 3, respectively). Finally, we also include the *percentage of a firm's equity held by the CEO* as a third measure of managerial incentives.

Monitoring

Four monitoring variables are used in this study, all of which are straightforward in their measurement. The first monitoring measure is the *outsider ratio*, which indicates the portion of the board composed of outside directors. The second measure captures *outside directors' stock ownership*, calculated as the percentage of common stock owned by outside directors. The third monitoring measure is the presence (1 = yes, 0 = no) of a *nondirector blockholder*, calculated as a dichotomous variable and coded as '1' if a nondirector stockholder owns at least 5 percent of the common stock, and '0' otherwise. The fourth monitoring measure, *CEO/chairman split*, captures the separation of the CEO and board chair positions, and is a dichotomous variable coded '1' if the CEO and board chair positions were separate and '0' otherwise.

Corporate strategy

Diversification was calculated using Jacquemin and Berry's (1979) entropy measure. This measure takes into account the number of segments

in which a firm operates, and the relative importance of each segment as a portion of total sales. It is given by

$$\sum_{j}^{i} P_{ji}\ln(1/P_{ji})$$

where P_{ji} is the revenue share of segment i and $\ln(1/P_{ji})$ is the weight for each segment i, or the logarithm of the inverse of its sales.

Control variables

Several control variables are also used throughout the empirical analyses. Since size may be related to our measures of compensation, ownership, and monitoring structures, we control for the effects of size (i.e., log of total sales) on our findings. Also, we control for the age of the CEO. An older CEO might be expected to have different preferences for contingent vs. noncontingent forms of compensation than would younger executives, and may also be less sensitive to discipline from the managerial labor market, thus presenting a more severe agency problem (Lewellen, Loderer, and Martin, 1987). We also control for industry effects to ensure that the compensation and monitoring structures observed are not simply outcomes of industry practices or traditions. This was achieved through the inclusion of dummy variables—each at the two-digit SIC code level—in all multivariate analyses (given the large number of variables included in each analysis, the coefficients for industry dummy variables will not be reported in Tables 2–6). In addition, we also included *prior firm performance*, measured as the prior year's return on assets, as a control variable, given that poor prior firm performance may lead firms to consider higher levels of incentives *and* monitoring.

Finally, we included the *prior year's value* of the dependent variable in all analyses. As a result, these models effectively analyze *change* in the relevant dependent variable as a function of the covariates. Means, standard deviations and correlations for all variables are shown in Table 1.

Data analysis

Most hypotheses were tested using pooled cross-sectional time series regression (Sayrs, 1989). This technique is suitable for analyzing continuous variables in a data set composed of multiple

Table 1. Pooled descriptive statistics and pooled Pearson correlation coefficients ($N = 2025$)

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Stock risk	0.03	0.01														
2. Debt-to-equity ratio	0.24	0.08	0.53													
3. Accounting risk	0.05	0.04	0.65	0.59												
4. Compensation contingency	0.26	0.29	−0.33	−0.16	−0.33											
5. Wealth change	0.29	0.24	−0.30	−0.24	−0.26	0.13										
6. CEO ownership	0.05	0.04	−0.23	−0.18	−0.25	−0.21	−0.13									
7. Diversification	1.22	0.38	−0.06	0.06	−0.07	0.28	0.14	0.14								
8. Outsider ratio	0.72	0.16	0.08	0.13	0.23	−0.11	−0.28	−0.18	−0.05							
9. Outside director ownership	0.03	0.06	0.06	0.17	0.19	−0.17	−0.07	−0.32	−0.06	0.32						
10. Nondirector blockholder	0.37	0.48	0.15	0.12	0.11	−0.12	−0.24	−0.23	−0.06	0.09	0.19					
11. CEO/chairman split	0.18	0.39	0.11	0.10	0.08	−0.17	−0.20	−0.20	−0.08	0.22	0.23	0.15				
12. Log of sales	6.92	0.97	0.12	0.11	0.15	0.11	0.15	−0.18	0.32	0.14	−0.09	−0.17	−0.18			
13. CEO age	57.40	6.87	−0.04	−0.01	−0.03	−0.05	0.08	−0.07	0.07	−0.05	−0.05	−0.06	0.10	0.16		
14. Return on assets	6.86	4.91	−0.15	−0.16	−0.18	0.07	0.12	0.07	−0.04	0.01	0.11	0.14	0.13	−0.08	0.05	

organizations observed at multiple time points. In order to correct for heteroskedasticity and autocorrelation, we used a two-stage generalized least-squares (GLS) model (Greene, 1993). This procedure partitions error variance into three components: random error in time, random error in space (e.g., across organizations), and random error not unique to time or space, and uses this information to derive efficient and unbiased parameter estimates (Sayrs, 1989). Thus, the GLS estimator takes the form

$$B = (X'S^{-1}X)^{-1}X'S^{-1}Y$$

given

$$Y = X_{nt}B_k + u_{nt}, \text{ with } u_{nt} = v_t + u_n + e_{nt}$$

where v_t are random over time, u_n are random over cross-sections, and e_{nt} are random over space and time, and S is the sum of the variances of the three error components. All independent variables were lagged by 1 year.

Where the dependent variables were dichotomous (i.e., CEO/board chairman split and presence of a nondirector blockholder) we used pooled logit regression analysis. Ordinary least-squares (OLS) analysis is inappropriate where the dependent variable is categorical, because OLS assumes a linear additive model with normally distributed error terms, while the true probability model is nonlinear with binomially distributed errors (Aldrich and Nelson, 1984). To correct for possible unspecified time effects as a source of heteroskedastic variance, we also included year-specific dummy variables (unreported) for these two models.

RESULTS

Risk-bearing and incentives

Tables 2–4 show the results relating to the hypothesized relationship between organizational (and managerial) risk and the use of managerial incentives. In Table 2, for each of the three risk proxies (debt-to-equity ratio and variation in market and accounting performance), GLS regressions are used to test the predicted inverse and logarithmic relation between the level of firm risk and the proportion of CEO total compensation comprised of long-term incentive

compensation. For each of the risk measures, the results in Table 2 show that as firm risk increases, firms' use of contingent compensation in their CEO compensation contracts significantly decreases (consistent with Hypothesis 1). Moreover, this relationship is logarithmic, such that contingent compensation decreases at a declining rate as risk increases. We estimated separate GLS regressions for each measure of risk to show that the test of the relation between firm risk and the use of incentives does not hinge on any single measure of firm risk.

Table 3 examines the relation between firm risk and incentive compensation in greater detail by measuring incentive compensation in terms of the proportion of total managerial wealth change (i.e., cash compensation + incentive compensation from LTIs and change in equity value) derived from noncash sources (i.e., changes in the value of LTIs and equity ownership). Table 3 reveals that firm risk is negatively and logarithmically related to the proportion of total managerial wealth change derived from incentives (consistent with Hypothesis 3).

Hypothesis 2, which argued that managerial risk-bearing concerns would result in more risky firms having CEOs hold lower levels of equity holdings in their firms, is tested in Table 4. The results are consistent with Hypothesis 2, indicating that the higher the level of firm risk, the lower the level of CEO stock ownership. This result holds for each of the three risk measures. Finally, the results for Hypothesis 4 are found in Table 2. Hypothesis 4 argued that the level of equity ownership held by CEOs is inversely and logarithmically related to the use of long-term incentive compensation. Again, the results are consistent with Hypothesis 4 and the risk-bearing explanation.

Thus, Tables 2, 3, and 4 provide evidence that firms with higher risk exhibit significantly lower levels of incentives in executive compensation contracts and CEO ownership. In addition, Table 2 shows that firms whose CEOs face higher levels of manager-specific risk (based on the level of their current equity holdings in the firm) are likely to have significantly less risk in their incentive compensation contracts. In summary, then, the consistent pattern of statistically significant results in Tables 2–4 suggests that those firms whose CEOs face substantial risk (due to

Table 2. GLS models predicting the proportion of CEO total compensation comprised of long-term incentive grants using prior measures of firm risk and CEO ownership

COMPENSATION CONTINGENCY$_t$ = a + b_1 PRIOR VALUE$_{t-1}$ + b_2SALES$_{t-1}$ − b_3CEO AGE$_{t-1}$ + b_4PERFORMANCE$_{t-1}$ + b_5CEO OWN$_{t-1}$ + b_6LN(RISK)$_{t-1}$ + u_t

												Estimated coefficients				
a		b_1		b_2		b_3		b_4		b_5		b_6		Risk measure	χ^2	Adj. R^2
Dependent variable in each model: long-term incentives																
0.066	(0.103)	0.259	(0.027)***	0.045	(0.010)***	−0.002	(0.001)†	−0.534	(0.147)***	−0.456	(0.228)*	−0.092	(0.013)***	Stock risk	182.03***	0.55
0.150	(0.107)	0.296	(0.027)***	0.041	(0.010)***	−0.003	(0.001)**	−0.596	(0.152)***	−0.206	(0.251)	−0.025	(0.006)***	Debt/equity	130.71***	0.48
0.075	(0.103)	0.263	(0.026)***	0.043	(0.010)***	−0.002	(0.001)†	−0.543	(0.148)***	−0.463	(0.227)*	−0.045	(0.006)***	Acct. risk	166.96***	0.53

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
Note: Standard errors are in parentheses; *t*-tests are one-tailed hypothesized effects, two-tailed for control variables.

Table 3. GLS models predicting the proportion of CEO wealth change derived from noncash sources using prior measures of firm risk

$$\text{NONCASH COMP}_t = a + b_1\text{PRIOR VALUE}_{t-1} + b_2\text{SALES}_{t-1} + b_3\text{CEO AGE}_{t-1} + b_4\text{PERFORMANCE}_{t-1} + b_5\text{LN(RISK)}_{t-1} + u_t$$

										Estimated coefficients					Risk measure	χ^2	Adj. R^2
a		b_1		b_2		b_3		b_4		b_5							

Dependent variable in each model: proportion of CEO wealth change derived from noncash sources

a		b_1		b_2		b_3		b_4		b_5		Risk measure	χ^2	Adj. R^2
−0.104	(0.084)	0.201	(0.027)***	0.043	(0.008)***	−0.001	(0.001)	−0.474	(0.123)***	−0.056	(0.009)***	Stock risk	151.76***	0.45
−0.034	(0.082)	0.198	(0.026)***	0.045	(0.008)***	−0.002	(0.001)	−0.534	(0.127)***	−0.018	(0.005)***	Debt/equity	141.22***	0.41
−0.109	(0.084)	0.204	(0.026)***	0.043	(0.008)***	−0.001	(0.001)	−0.463	(0.123)***	−0.041	(0.006)***	Acct. risk	169.36***	0.48

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; $p < 0.001$
Note: Standard errors are in parentheses; *t*-tests are one-tailed hypothesized effects, two-tailed for control variables.

Table 4. GLS models predicting CEO equity holdings using prior measures of firm risk

$$\text{CEO OWN}_t = a + b_1\text{PRIOR VALUE}_{t-1} + b_2\text{SALES}_{t-1} + b_3\text{CEO AGE}_{t-1} + b_4\text{PERFORMANCE}_{t-1} + b_5\text{LN(RISK)}_{t-1} + u_t$$

				Estimated coefficients									
a		b_1		b_2		b_3		b_4		b_5		Risk measure	χ^2	Adj. R^2
Dependent variable in each model: CEO ownership														
0.041	(0.008)***	0.521	(0.017)***	−0.003	(0.001)***	−0.0000	(0.0001)	−0.021	(0.010)*	−0.003	(0.0007)***	Stock rise	1085.55***	0.75
0.050	(0.008)***	0.389	(0.017)***	−0.003	(0.001)***	−0.0000	(0.0001)	−0.022	(0.010)*	−0.002	(0.0007)**	Debt/equity	574.80***	0.73
0.038	(0.008)***	0.524	(0.017)***	−0.003	(0.001)***	−0.0001	(0.0001)	−0.022	(0.010)*	−0.002	(0.0006)**	Acct. risk	1085.15***	0.75

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
Note: Standard errors are in parentheses; t-tests are one-tailed hypothesized effects, two-tailed for control variables.

either the firm's riskiness or their CEO's level of equity holdings in the firm) face greater costs from imposing more risk-bearing on managers through compensation contracts. Furthermore, the observed logarithmic relationships are consistent with the hypothesized 'diminishing behavioral returns' from increases in incentive compensation.[12] In conclusion, the results suggest that organization-specific and manager-specific factors affect managers' willingness to accept contingent compensation in a way that results in predictably different incentive compensation contracts across firms.

Incentives, strategy, and monitoring

The second set of results address the organizational contingencies that can affect the costs and benefits of using monitoring. The first contingency examines whether firms seek to address the differences in incentive compensation contracts discussed above by increasing the level of monitoring when CEOs do not bear substantial incentive compensation risk. The tests of Hypotheses 5a–5d and 6a–6d, all of which address this relationship, are shown in Tables 5 and 6, respectively. The results are quite robust in support of the hypotheses.

For example, Table 5 shows that firms facing a weak alignment of owner and manager interests, i.e., firms whose CEOs hold smaller equity positions in the firm, are more likely to have greater monitoring, in the form of (1) a larger percentage of outside directors on their boards (consistent with H5a), (2) a larger percentage of director stock ownership (consistent with H5b), (3) a major nonboard member blockholder (consistent with H5c), and (4) a separate CEO/ Board Chairman position (consistent with H5d). In each case, the greater the magnitude of the agency incentive problem, as defined by lower levels of managerial stock holdings, the greater the level of monitoring provided. Moreover, these relationships are logarithmic, showing that

increases in CEO equity holdings in the firm reduce the level of board monitoring at a decreasing rate.

When extending the definition of the magnitude of the agency incentive problem to encompass the total executive wealth change from LTIs and equity ownership, the inverse relationship between the levels of incentives and monitoring is also found for three of the four models. Firms with managers having a lower proportion of their total managerial wealth change derived from incentives are more likely to have (1) a larger percentage of outside directors on their boards (consistent with H6a), (2) a major nonboard member blockholder (consistent with H6c), and (3) a separate CEO/Board Chairman position (consistent with H6d). Moreover, this relationship is logarithmic, such that increases in noncash compensation diminish the level of board monitoring at a decreasing rate.

Taken together, the findings reported in Tables 5 and 6 suggest that firms facing a more severe managerial incentive problem (due to CEOs having lower incentives from their compensation contracts and equity holdings) are generally more likely to have governance structures that provide a higher level of monitoring of managerial behavior. In addition, the inverse logarithmic relationship between incentives and monitoring is consistent with the argument that firms experience declining behavioral (i.e., motivational and symbolic) returns from increased monitoring.[13] Thus, the results suggest that the benefits of monitoring are predictably different across organizations.

The second organization contingency hypothesized to affect the costs of monitoring was the complexity of a firm's corporate strategy, i.e., diversification. Again, Tables 5 and 6 indicate strong statistical support for this hypothesis. Table 5 shows that firms pursuing a more complex strategy of greater diversification, in which monitoring is more costly, relied less on monitoring across all four measures (i.e., H7a–H7d) than those firms with a less complex strategy of little or no diversification. The hypothesized

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[12] Although we did not formally compare coefficients for the logged and unlogged variables, the significance levels of the logged variables were consistently greater than those of the unlogged variables. Moreover, examination of augmented component-plus-residual plots with cubic splines (Mallows, 1986) for relationships between each risk measure and the various measures of incentive compensation also consistently suggested a logarithmic, rather than linear relationship.

[13] Again, the significance levels of the logged compensation variables were consistently greater than effects of the unlogged variables, and examination of augmented component-plus-residual plots with cubic splines for these relationships consistently suggested a logarithmic, rather than linear relationship.

Table 5. GLS and pooled logit models predicting level of board monitoring using prior diversification strategy and CEO stock ownership

$MONITOR_t = a + b_1PRIOR\ VALUE_{t-1} + b_2SALES_{t-1} + b_3CEO\ AGE_{t-1} + b_4PERFORMANCE_{t-1} + b_5DIVERSIFICATION_{t-1} + b_6DIVERSIFICATION\ SQUARED_{t-1} + b_7LN(CEO\ OWNERSHIP)_{t-1}$

Monitoring measure (dependent variable)	Estimated coefficients									
	a	b_1	b_2	b_3	b_4	b_5	b_6	b_7	χ^2	Adj. R^2
Outsider ratio	0.191***	0.864***	−0.012*	−0.0001	−0.074†	0.003**	−0.0002*	−0.015***		
	(0.050)	(0.014)	(0.006)	(0.0004)	(0.043)	(0.001)	(0.0001)	(0.002)	1501.93***	0.89
Outside director ownership	0.003	0.548***	−0.001	−0.0003	−0.051†	0.005**	−0.000006*	−0.003***		
	(0.021)	(0.018)	(0.002)	(0.0003)	(0.030)	(0.002)	(0.000003)	(0.001)	980.34***	0.61
Nondirector blockholder	0.169	5.622***	−0.276*	−0.002	−2.822	0.187*	−0.002*	−0.150*		
	(1.401)	(0.218)	(0.125)	(0.012)	(2.241)	(0.090)	(0.001)	(0.065)	257.15***	−
CEO/chairman split	0.166	2.680***	−0.129	0.012	−1.489	0.330*	−0.061**	−0.110*		
	(0.967)	(0.169)	(0.087)	(0.013)	(1.561)	(0.155)	(0.023)	(0.053)	260.57***	−

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
Note: Standard errors are in parentheses; t-tests are one-tailed hypothesized effects, two-tailed for control variables.

Table 6. GLS and pooled logit models predicting level of board monitoring using prior diversification strategy and the proportion of CEO wealth change derived from noncash sources

$MONITOR_t = a + b_1PRIOR\ VALUE_{t-1} + b_2SALES_{t-1} + b_3CEO\ AGE_{t-1} + b_4PERFORMANCE_{t-1} + b_5DIVERSIFICATION_{t-1} + b_6DIVERSIFICATION\ SQUARED_{t-1} + b_7LN(NONCASH)_{t-1} + u_t$

Monitoring measure (dependent variable)	Estimated coefficients									
	a	b_1	b_2	b_3	b_4	b_5	b_6	b_7	χ^2	Adj. R^2
Outsider ratio	0.195***	0.864***	−0.012†	−0.0001	−0.060	0.002*	−0.0002*	−0.036***	1525.56***	0.91
	(0.049)	(0.014)	(0.006)	(0.0003)	(0.041)	(0.001)	(0.0001)	(0.006)		
Outside director ownership	0.004	0.530***	−0.001	−0.0003	−0.059*	0.005**	−0.000007*	−0.008	974.78***	0.57
	(0.019)	(0.019)	(0.002)	(0.0003)	(0.030)	(0.002)	(0.000003)	(0.006)		
Nondirector blockholder	0.542	5.387***	−0.196	−0.004	−3.122	0.186*	−0.002*	−1.260**	1414.47***	−
	(1.381)	(0.221)	(0.126)	(0.017)	(2.298)	(0.089)	(0.001)	(0.434)		
CEO/chairman split	0.277	2.723***	−0.147†	0.014	−1.661	0.333	−0.039*	−1.436***	442.09***	−
	(0.975)	(0.176)	(0.090)	(0.013)	(1.687)	(0.155)	(0.017)	(0.382)		

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
Note: Standard errors are in parentheses; t-tests are one-tailed hypothesized effects, two-tailed for control variables.

curvilinearity (the diversification-squared term) was also found to be statistically significant: firms with a corporate strategy of conglomerate-like diversification, which is less costly to monitor, also engaged in greater monitoring across all four measures.[14] The results in Table 6 (which use an alternative measure of incentive compensation) are also, not surprisingly, consistent in their support for H7. In summary, then, the results support the notion that firms make less use of board monitoring in situations where such monitoring is more costly, i.e., where complex strategies make the reduction of information asymmetry more difficult.

DISCUSSION

Overall, the empirical results provide strong statistical support for the study's hypotheses regarding the potential costs of incentive compensation and board monitoring. In testing the first set of hypotheses relating to variation in firms' use of incentive compensation, the results consistently show an inverse relationship between levels of firm risk (measured three different ways) and the degree to which incentive compensation for CEOs is used (also measured three different ways). This finding highlights how organizational contingencies, such as firm risk, can increase the costs of using incentives in large U.S. corporations, and complements Beatty and Zajac's (1994) findings for smaller firms engaged in an initial public offering.

Moreover, the negative relationship between CEO equity holdings and the use of LTIs suggests that CEO-specific contingencies can also influence the costliness of using incentive compensation. Taken together, both sets of results support the interpretation that top managers' willingness to accept risky compensation (or stated differently, the costs to a firm in forcing incentive compensation on top managers) varies across firms and that the firm-specific and CEO-specific factors examined here are important predictors in explaining this variance. More generally, the

findings support the paper's argument that more incentive compensation is not always better and that one can identify and predict the circumstances under which this is likely to be true.

Moreover, the observed, inverse *logarithmic* relationships between firm risk and levels of incentive compensation suggest that firms derive diminishing behavioral returns from increasing CEO incentives. These results are consistent first with the notion that the salience to a CEO (and thus changes in his or her 'cognitive' attention and motivation) may be greatest when changing incentive compensation from zero or a very small level to a modest level than when changing an equal amount from an initially large level to an even larger level. Furthermore, there may also be diminishing behavioral returns of a more social origin. Specifically, to the extent that long-term incentives and other forms of incentive compensation have become legitimate and socially expected sources of incentive alignment (Westphal and Zajac, 1994), firms and CEOs may feel socially obligated to have 'token' CEO incentive compensation, even where firm risk is high. In effect, the reputational benefits derived from symbolically conforming to normative compensation practices outweigh the costs of having the CEO accept a relatively small degree of compensation risk (Meyer and Rowan, 1977). Conversely, the symbolic benefits derived from increasing incentives beyond some token level are relatively small in comparison to the costliness of forcing greater compensation risk upon a CEO.

One implication of the findings discussed thus far is that the issue of how much risk a CEO should be expected to bear in his/her compensation agreement is very much an open question. While formal models of agency recognize the incentive/risk-bearing trade-offs in theory, most compensation studies have, in fact, treated compensation arrangements as exogenous (Lambert and Larcker, 1987). Future compensation research might be well served by devoting more attention to agents' preferences when examining incentive contracts (Beatty and Zajac, 1994; Lambert, Larcker, and Verrecchia, 1991). In particular, empirical, organizationally based research is needed to establish the firm-specific and CEO-specific contextual factors that can shape CEOs' willingness to accept contingent compensation, and to then use this knowledge

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[14] Note that finding this hypothesized curvilinear effect also addresses the potential criticism of reverse causality, i.e., that lower levels of monitoring lead to higher diversification. Recall also that the present study uses a longitudinal design with lagged independent variables.

about the expected variety in actual compensation contracts to address the CEO pay-for-performance question more clearly. Such an expected variety of compensation contracts across firms might explain, in part, the inability of cross-sectional empirical work (e.g., Jensen and Murphy, 1990a) to establish a uniform pay-for-performance relationship for CEOs.

Interestingly, as noted by Beatty and Zajac (1994), organization behavior research on top executive compensation has also generally placed greater emphasis on the importance—from an incentive and control standpoint— of imposing strong pay-for-performance linkages, rather than the possible disadvantages of imposing risk-bearing in managerial compensation contracts. This omission is somewhat surprising, given that the organization behavior literature on compensation has historically recognized that different forms of compensation, such as pay-for-performance, vary in their attractiveness to individuals, and therefore vary in their appropriateness as incentive-motivational tools (Lawler, 1971; Mahoney, 1979).[15] Future research might also examine other potential costs resulting from the heavy use of CEO incentive compensation, such as its possibly detrimental effects on motivation at lower levels of the organization, as might be suggested by a tournament perspective on managerial compensation in organizations (Lazear and Rosen, 1981; O'Reilly, Main, and Crystal, 1988).

In terms of the costs and benefits of monitoring, the results are again quite consistent with the hypotheses, showing that the levels of monitoring observed are inversely related to the levels of managerial incentives used and the complexity of an organization's strategy. These robust results are obtained using multiple measures of monitoring and incentives, and a widely used measure of corporate strategy. More generally, the observed empirical relationships support the paper's argument that: (1) there are both benefits and costs to monitoring top management; (2) these costs/benefits will vary across organizations; (3) the level of monitoring observed will therefore differ across firms; and (4) firm-specific contin-

gencies such as the degree of incentive compensation use and the complexity of a firm's strategy can explain the source of this variance.

In addition, the observed, inverse *logarithmic* relationships between incentive compensation and monitoring suggest that firms experience diminishing returns to increased levels of monitoring. For instance, the findings are consistent with the interpretation that increasing board monitoring by some amount serves to 'get the CEO's attention,' and that such cognitive or attentional benefits are less important where monitoring is already high. In addition to these motivational considerations, there may be more sociopolitical and institutional factors contributing to diminishing behavioral returns from increases in monitoring. Specifically, to the extent that CEOs resist infringements upon their autonomy and discretion, boards may be loath to increase monitoring further where it is already high. Where monitoring is slight or nonexistent, in contrast, firms may perceive external, social pressures to increase monitoring as a symbolic affirmation of their commitment to shareholder interests (Westphal and Zajac, 1994).

For organizational and legal researchers interested in establishing guidelines for structuring boards of directors to ensure maximum monitoring capability (cf. Lorsch and MacIver, 1989), an implication of this study's findings is that such well-intended, focused attention may be misplaced, given that firms' effective use of managerial incentives can substantially lessen the need for costly monitoring, and given evidence for declining motivational benefits from increased monitoring. Future research could also examine the possible interaction of monitoring and incentives, e.g., the role of monitoring in enhancing the specific estimators chosen for incentive contracts (cf. Stiglitz, 1975).

Also, an implication for strategy researchers is that there may be corporate governance implications that arise from decisions regarding the choice of particular corporate strategies. More specifically, the study suggests that the pursuit of more complex corporate strategies is associated with an increase in the cost of monitoring, and thus a reduction in the level of monitoring observed. While corporate strategy decisions are traditionally considered to be a function of competitor and resource situations, the findings of this study imply that governance

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[15] One possible explanation of this may be that organizational research using agency theory has tended to draw from the positive, rather than the normative, agency literature (Eisenhardt, 1989).

costs or governance capabilities should perhaps also be included as a relevant consideration in the decision process leading to the choice of corporate strategy.

Taken together, the findings are supportive of our basic contingency argument: (1) using incentive compensation contracts for top managers is more costly for more risky firms (stemming from the risk aversion of top managers); (2) firms facing this potential problem of inadequate incentives experience greater benefits from providing higher levels of monitoring by the board of directors; and (3) using monitoring also has costs, particularly for firms with more complex corporate strategies (stemming from increased levels of information asymmetry associated with such strategies). More generally, the study suggests the need for governance researchers to recognize certain inherent conflicts, trade-offs, and substitution possibilities between different control mechanisms (Beatty and Zajac, 1994).

This need can be seen, for example, in research interested in the classic 'problem' of the separation between ownership and control (Berle and Means, 1932; Morck *et al.*, 1989). Specifically, the present study's results suggest that a narrow focus on management stock ownership is an incomplete definition of the incentive problem (e.g., Morck *et al.*, 1988), since (1) incentive compensation contracts for top executives might be used to address the problem of the ownership/control separation, (2) increased monitoring could be used to 'compensate' for the lack of incentive contracts, and (3) the costliness of dealing with the problem of risk aversion actually implies the desirability of *some* separation of ownership and management. Future organizational research could begin to address these issues jointly, rather than in a piecemeal fashion.

In conclusion, the study suggests that while there currently may be some perceived benefit in suggesting that modern corporations suffer from insufficient incentive compensation and board monitoring, there may be some very real costs in prematurely reaching such a consensus. The present study suggests that future research considering explicitly how strategic, organizational, and individual contingencies can affect the conflicts, trade-offs, and substitution possibilities in the use of incentives and monitoring may have the greatest potential to develop

a more enduring understanding of important corporate governance questions. This study can be considered a first step in this process by highlighting that optimal levels of incentives and monitoring are not likely to be maximal levels.

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APPENDIX: FORMULAS USED IN CALCULATING COMPENSATION CONTINGENCY

Stock options were valued using the following, simplified version of the Black-Scholes (1973) model (Kerr and Kren, 1992; Noreen and Wolfson, 1981):

$$\text{option value} = \text{price} \times \text{shares} \times [\exp(-dt)N(Z) - \exp(-rt)N(Z - s\,t)]$$

where

price	=	the exercise price of an option;
shares	=	the number of shares granted;
d	=	the average dividend yield over the previous 5 years;
t	=	the time to the expiration of the option, either 5 or 10 years;
N	=	the standard normal probability distribution function;
r	=	the risk-free interest rate, based on 5- and 10-year average yields on U.S. government securities;
s	=	the stock return variance for the previous 5 years; and
Z	=	$(r - d + s^2/2) \times (t/s\,t)$.

When the expiration date was not specified, we assumed 10 years. The Black–Scholes model has been criticized for employing several unrealistic and/or inaccurate assumptions. For instance, although options are nontransferable, the model assumes that options are marketable and sold on the date of grant. In addition, it is implicitly assumed that executives value options in the same way as shareholders, even though each party holds different risk preferences (Lambert *et al.*, 1991). Nevertheless, despite these theoretical shortcomings, the model has performed well at predicting the prices of marketable warrants, which resemble stock options (Noreen and Wolfson, 1981). Moreover, a widely accepted alternative is not currently available.

Performance units/cash were valued using the following formula, used by several large consulting firms in conducting surveys of executive compensation (cf. Towers Perrin 1991 Compensation Data Bank):

$$\text{value} = \text{price} \times \text{shares} \times \text{target} \times [1/((r + p + f)^z)]$$

where

price	=	the price at which shares/units were granted;
shares	=	the number of shares/units granted;
target	=	the target payout, expressed as portion of shares granted;
r	=	the risk-free interest rate, based on 5- and 10-year average yields on U.S. government securities;
p	=	long term average equity premium (6%);
f	=	forfeiture risk (3%); and
z	=	length of performance period.

Where adequate information was not provided in the proxy statement, we employed a progressive series of assumptions. For instance, if the date of grant was specified but the grant price was not, we used the market price at date of grant; if neither the grant price nor the grant date was provided, we used the average annual market price. Moreover, where the target payout was not specified, we assumed 100 percent. Analogous assumptions were employed in valuing other incentive vehicles. For instance, where the share value was not specified, book units were valued according to the book value per share on the date of grant. The forfeiture risk is based upon empirical analysis or forfeiture among *Fortune* 500 CEOs conducted by a large compensation consulting firm.

In valuing performance shares and restricted stock, we used a simplified adjustment factor: $1/(f^z)$. This approach implicitly sets the discount rate equal to expected stock returns (cf. Towers Perrin 1991 Compensation Data Bank).