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# Compensation and Board Structure: Evidence From the Insurance Industry

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**Abstract**

Monitoring by outside board members and incentive compensation provisions in executive pay packages are alternative mechanisms for controlling incentive problems between owners and managers. The control hypothesis suggests that if incentive conflicts vary materially, those firms with more outside directors also should implement a higher degree of pay-for-performance sensitivity. Our evidence is consistent with this control hypothesis. We document a relation between board structure and the extent to which executive compensation is tied to performance in mutuals: compensation changes are significantly more sensitive to changes in return on assets when the fraction of outsiders on the board is high.

## Introduction

A long-standing proposition in organizational economics is that more diffuse ownership reduces incentives to monitor managers and limit managerial perquisite consumption (Berle and Means, 1932). However, dysfunctional managerial incentives can be controlled through an array of governance mechanisms. In this article, we focus on two such mechanisms—board structure and pay-for-performance compensation. Our analysis provides evidence on the monitoring role of the board of directors as well as the effectiveness of pay-for-performance compensation. Importantly, it identifies a positive association between pay-for-performance sensitivity and board structure in mutual insurance companies, consistent with the hypothesis that these two policies are complements.

Others have analyzed these control mechanisms. Fama (1980) argues that monitoring by independent directors helps reduce contracting costs that arise between owners and managers. Rosenstein and Wyatt (1990) provide evidence of the importance of independent directors by documenting significantly positive stock returns at the announcement of the appointment of outside directors but returns that are

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indistinguishable from zero for announcements of inside-director appointments.[1] There also is substantial empirical research that examines the argument by Holmstrom (1979) and Shavell (1979) that tying pay to performance helps reduce contracting costs. This research documents a positive relation between changes in executive compensation and both accounting- and market-based performance measures.[2]

Yet these control mechanisms typically are analyzed in isolation—even though they are endogenous and theory suggests important interactions in their selection. Holmstrom and Milgrom (1991) argue that organizational choices represent the selection of an organizational system. In their model, activities compete for an executive's attention and there is a tendency for the levels of incentives provided for the different activities to be complementary in the severity of the contracting problem. They suggest that a critical aspect of organizational analysis is to explain how various policy choices are intertwined, and they derive sufficient conditions for policy choices to be correlated across firms.

But we argue that because ownership concentration varies substantially across most populations of common stock companies, the conditions necessary to ensure that policies will be correlated in the cross-section are usually violated.[3] Our data allow us to control for variation in ownership concentration; it is from the insurance industry—an industry with a large contingent of mutual companies. Unlike stock companies, where ownership concentration varies widely, mutuals are diffusely owned. The more limited variation in ownership concentration within this population of companies increases the likelihood of identifying the hypothesized complementary relation between board structure and pay-for-performance compensation.

[1]Yermack (1996) finds no association between the percentage of outside directors and firm performance. However, because Yermack examines differences in average returns across firms with different board structures, his tests have low power (see Schwert, 1981). Other studies that suggest the importance of independent directors examine specific events. These studies include: Weisbach (1988), who examines CEO turnover; Byrd and Hickman (1992), who analyze stock returns for bidders in takeover contests; Lee et al. (1992), who consider management-buyout announcements; Brickley, Coles, and Terry (1994), who focus on poison-pill adoptions; and Cotter, Shivdasani, and Zenner (1997), who analyze target shareholder returns in tender offers. Studies also examine the relation between board size and performance; for example, Coles, Daniel, and Naveen (2008) document an inverse relation.

[2]These studies include: Murphy (1985), Barro and Barro (1990), Gibbons and Murphy (1990), Lambert and Larcker (1987), Sloan (1993), and Ke, Petroni, and Safieddine (1999). Yet a lively controversy about CEO compensation practices is ongoing. Critics argue that because the CEO exerts substantial influence on the board of directors, boards regularly fail to structure CEO compensation to maximize value for owners. (See, for example, the discussions in Core, Holthausen, and Larcker, 1999; Bebchuk and Fried, 2004).

[3]This is perhaps why mixed results are reported in studies examining the association between compensation policy and board structure. The relation between the level (as opposed to pay-for-performance sensitivity) of top executive compensation and board composition has been examined, but with mixed findings. For example, Core, Holthausen, and Larcker (1999), Lambert, Larcker, and Weigelt (1993), and Boyd (1994) report a positive association between CEO compensation and the percentage of the board that are outside directors; Finkelstein and Hambric (1989) find no relation. We report a negative relation in Table 2 using data from publicly held stock insurance companies.

Our mutual insurance company data also control another potential problem. Mutual ownership rights are inalienable; hence, control mechanisms that require alienable ownership rights (like executive stock options) are infeasible. Hence, we expect that our analysis of the joint determination of board structure and pay-for-performance compensation will have more power employing mutual data because: (1) mutuals have a more limited set of control mechanisms that they can employ and (2) measurement problems associated with stock-based incentive-compensation plans are absent.

In addition to analyzing data from mutual insurance companies, we report the results from an analysis of stock insurance firms. Although use of data from stock insurers subjects this analysis to the data problems identified above, including these firms facilitates comparison with the results of prior studies. Most studies examine data from industrial companies. Differences between our results from mutuals and theirs are potentially attributable either to a more effective resolution of data problems or to differences across industries. Reporting the results from both common stock and mutual insurers permits better identification of these two effects.

The remainder of our article is organized into four sections: In the second section we discuss the effects of ownership structure on incentive conflicts and the roles of board structure and pay-for-performance compensation in controlling these incentive conflicts. We describe our sample in the third section. The fourth section presents board structure and pay-for-performance results as well as tests to examine their robustness to alternative specifications. We offer a summary and our conclusions in the fifth section.

## COMPLEMENTARITY, OWNERSHIP CONCENTRATION, AND ALTERNATIVE HYPOTHESES

In a common-stock insurance company, managers, owners, and customers can be completely separate groups. Separation permits gains from specialization but engenders incentive conflicts between owners and managers as well as between customers and owners. Mechanisms that potentially control these conflicts within stock companies include the board of directors; the structure of incentive compensation; provisions of the corporate charter and bylaws; monitoring by stock analysts, institutional investors, and other large blockholders; the threat of outside takeover; and oversight by insurance regulatory and rating agencies.

In a mutual company, conflicts between customers and owners are controlled primarily by making them the same parties.[4] But policyholder rights within a mutual are more limited than the sum of policyholder and stockholder rights within a stock insurance company. For example, ownership rights of mutual policyholders are inalienable. Therefore, the control technology available to mutual owners is more limited: mechanisms that require transferable ownership rights (such as hostile takeovers, monitoring by institutional investors, or executive stock option plans) are infeasible.

[4]The conflict between stockholders and policyholders is discussed in Mayers and Smith (1981, 1988, 1994). Since policyholders are fixed claimants of the firm, they are like lenders in credit markets and they face similar incentive-contracting problems. Thus, we expect that mutuals should have a comparative advantage in lines of insurance where conflicts between owners and policyholders are more important, for example, where contracts are longer lived.

If this more restricted control technology within mutuals raises the marginal product of outside board members, ownership structure and board composition should be complements. Hence, mutuals should appoint more outside directors to their corporate boards. Furthermore, within the population of mutuals, those where incentive conflicts are larger should appoint more outside directors as well as employ higher pay-for-performance sensitivity—these two activities should be complements.

### The Complements Hypothesis

Activities are defined to be complements if doing more of one increases the marginal benefit of the other (Milgrom and Roberts, 1990). Here, we argue that more independent directors increase the precision with which performance is measured, thereby increasing the effectiveness of pay-for-performance sensitivity in pay packages. Increased effectiveness increases the benefit of pay-for-performance sensitivity. Similarly, a higher degree of pay-for-performance sensitivity increases the benefit of appointing independent directors.[5] We label this the *complements hypothesis*.

An important issue is whether the policy variables that we argue are complements can be expected to have positive correlation in cross-sectional data. We express the generalized value function for the firm as

$$V=V(C, B; \delta),$$

where $C$ and $B$ are our policy variables—$C$ is the sensitivity of executive compensation to performance and $B$ is the fraction of independent directors on the board. The parameter, $\delta$, represents the level of discretion that is required of executives to manage the firm, given its lines of business.[6] Holmstrom and Milgrom (1991) identify sufficient conditions that assure positive correlation among the policy variables in cross-sectional data:[7]

1. The value function is the same for all firms.
2. The only exogenous (predetermined) parameter is $\delta$, and changes in $\delta$ shift the marginal benefits of both choice variables in the same direction.
3. The choice variables are complements (the value function is supermodular in the policy variables).

Observing nonpositive correlations would be evidence that these assumptions are invalid; positive correlations would indicate either that the policy variables are

[5] We also could argue, like Holmstrom and Milgrom (1991), that incentives provided by independent directors and pay-for-performance sensitivity focus on activities that compete for an executive's attention.

[6] Discretion can be limited by concentrating on fewer lines of business, charter restrictions on investments, limitations on dividends, geographically concentrating the business, regulatory oversight, and policy loans, for example. We assume a firm's required discretion is predetermined.

[7] See Milgrom and Roberts (1990), Holmstrom and Milgrom (1991), Brickley (1999), and Marx, Mayers, and Smith (2001). Marx, Mayers, and Smith apply this analysis to policy choices within insurance firms.

complements or that negative indirect effects are small relative to direct effects. But ultimately, whether these two policy variables are complements is an empirical question.

### Ownership Concentration

Stock companies have a broader array of available control mechanisms; this makes predicting the correlation under the complements hypothesis more complicated. For example, greater inside ownership concentration internalizes owner–manager conflicts, thereby reducing the benefits of monitoring by institutional investors, other large blockholders, and outside directors. Thus, additional inside ownership concentration could control incentive conflicts and reduce the importance of board composition. Alternatively, more outside ownership concentration (e.g., outside large blockholders) provides greater external monitoring of executives and reduces the demand for incentive compensation while increasing the importance of independent directors on the board. Therefore, because ownership concentration varies substantially across most populations of common stock companies, the conditions necessary to ensure that board composition and compensation sensitivity will be correlated are violated. As a result, the complementary relation is less likely to be observed, unless one can control for potentially complicated implications of variation in ownership.[8]

Our data from the insurance industry allow us to control for variation in ownership concentration. The insurance industry includes a large contingent of mutual companies. Unlike stocks, where ownership concentration varies widely, mutuals are diffusely owned. This limited variation in ownership concentration increases the likelihood of identifying the hypothesized complementary relation between board composition and compensation sensitivity. Also, since mutuals have a more restricted set of control mechanisms that they can employ, our analysis of the joint determination will have more power.

### Alternative Hypotheses

Differences in control technologies between mutuals and stocks also suggest other differences in insurance company operations. For example, theory implies and evidence indicates that mutuals concentrate on less risky lines of insurance.[9] However, there is variation in the riskiness of the underwriting business across both mutuals

[8]The sensitivity of executive compensation to accounting performance measures for publicly and privately held stock insurance companies (where ownership concentration is high) is examined by Ke, Petroni, and Safieddine (1999). Consistent with their hypothesis, they find that pay is tied to performance for public stock companies, but not for private companies. (Ke, Petroni, and Safieddine examine both subsidiary and nonsubsidiary companies. They define a subsidiary of a publicly traded company as a "private company" in their analysis.) Their analysis documents similar results using measures based, either on statuatory or generally accepted accounting principles (GAAP). Mayers and Smith (1992) compare compensation for executives of stock and mutual life insurance companies. They report evidence of pay for accounting performance in stock companies, but not in mutuals. Neither study assessing the responsiveness of compensation to changes in accounting performance considers board structure.

[9]Mayers and Smith (1986, 1994) report significant differences in operating choices between stocks and mutuals. Lamm-Tennant and Starks (1993) document that stocks write more

and stocks. Brickley and James (1987) argue that outside directors perform functions other than monitoring, such as providing legal advice, strategic planning, and customer development. If in riskier lines this "expertise" demand for outside board members is greater and pay for performance is more effective, then this implies a relation between compensation sensitivity and board structure. The fraction of outsiders on the board would increase with the degree to which executive compensation is tied to performance, but not because outside board members are better monitors.[10] We label this the *effectiveness hypothesis*.

In addition to implications across lines, the complements and effectiveness hypotheses have implications for variation associated with firm size. Two arguments suggest that larger firms should adopt more incentive compensation: (1) if larger firms are more complex and require more managerial discretion, pay for performance should be more effective in larger firms,[11] and (2) Smith and Watts (1982) argue there are fixed costs associated with the adoption and administration of formal incentive compensation plans. This implies that larger firms would use such plans more extensively.

Two arguments also link firm size and board composition: (1) if the demand for monitoring is greater in larger firms, larger insurers will employ more outside directors, and (2) if larger firms are more likely to have an appropriate scale to hire managers with specific required expertise, the expertise demand for independent directors will be lower in larger firms. These arguments imply positive (complements hypothesis) or negative (effectiveness hypothesis) relations between the fraction of outside board members and pay-for-performance sensitivity.

With risk-averse executives, there is a basic trade-off between providing incentives and optimal risk sharing. This argument suggests the degree of incentive alignment by pay-for-performance compensation should be lower for executives of high-risk firms. This *risk-aversion hypothesis* thus represents a direct offsetting effect to the variation across lines under the effectiveness hypothesis.[12]

Therefore, there are three nonmutually exclusive hypotheses, each with potential implications for the association between the structure of the board of directors and the degree to which executive compensation is tied to performance: the complements, effectiveness, and risk-aversion hypotheses. Because the risk-based effectiveness and risk-aversion hypotheses are countervailing, we can observe only their net effect. Because riskiness varies across lines, we control for lines of insurance in our tests.

high-risk policies than mutuals. Lee, Mayers, and Smith (1997) find that mutuals engage in less additional risk taking in their asset portfolios following the adoption of insurance guaranty funds.

[10] Prendergast (2002) argues that firm risk could be positively related to the value of CEO discretion, which in turn implies a higher degree of pay-for-performance alignment.

[11] Note, however, that if in a more complex organization there is a greater variety of tasks to be performed, then motivating executives to strike the appropriate balance among tasks is not simple. Compensating the executive based on what is measurable will encourage the executive to exert extra effort on the compensated task but less effort on the others. See Holmstrom and Milgrom (1991).

[12] See Jin (2002) for analysis of the risk-aversion hypothesis.

We also control for firm size because effectiveness and board structure potentially are correlated with firm size.

## DATA DESCRIPTION AND MEASUREMENT PROBLEMS

### Data Description

We employ CEO compensation data from *The Insurance Forum* for a sample of insurance companies over the period 1974–1997.[13] The 1975 *Forum* reports 1974 compensation data from five insurance companies (all mutuals) on executives that earned at least $100,000. Over subsequent issues, both the number of companies reported and the compensation threshold employed have risen: compensation reported for 1997 covers 1,339 executives from 243 companies each of whom earned at least $500,000.

We record data for the individual listed with the title CEO; if no CEO is listed, we select the executive with the highest compensation and the title of either president or chairman of the board. If no one is designated as either CEO, president, or chairman, we eliminate that company year from our sample. Names and positions are confirmed by checking the appropriate edition of *Best's* (A.M. Best Co., 1974–1997) or *Moody's* (Moody's Investors Service, 1974–1997).[14] Since 1993, only names are reported in *The Forum* and thus positions are determined exclusively using *Best's* or *Moody's.*

Our sample comprises 1,480 annual observations from 311 different companies and 444 different executives; summary statistics are reported in Table 1. There are 227 stock companies with 949 annual observations and 83 mutual companies with 531 annual observations. The stock companies include 85 nonsubsidiary publicly held companies and 142 subsidiary companies with 543 and 406 annual observations, respectively.[15]

*Firm Size and Performance.* Panel A of Table 1 reports summary statistics on several size measures (admitted assets, total premiums, and number of subsidiaries) and

[13]*The Insurance Forum* is published monthly by Insurance Forum, Inc. We thank Joseph M. Belth, the editor, for providing us with early issues. *The Forum* reports compensation data that is obtained from either the Nebraska insurance department, the New York insurance department, or proxy statements filed with the Securities and Exchange Commission. Although the specific descriptions from these three sources vary, each measures total compensation. The Nebraska insurance department describes its total compensation data as the total of salary, bonus, and "all other compensation." The New York insurance department describes its compensation data as all "salaries, compensation, and emoluments." Finally, the Securities and Exchange Commission describes its data as the total of "salary, bonus, 'other annual compensation,' 'restricted stock awards,' 'long term incentive plan payouts,' and 'all other compensation.'"

[14]These also are our sources for auxiliary data.

[15]Approximately 5 percent (22) of the subsidiary-stock annual observations are subsidiaries owned by mutuals. Mayers and Smith (1992) argue that mutual-owned stock companies should engage in activities similar to those of mutual companies. The owners of a mutual-owned stock are ultimately the policyholders of the parent mutual, and the executives of the subsidiary stock company are appointed by the parent mutual executives. We have repeated our analysis excluding these observations. Since exclusion alters no result, we include them.

**TABLE 1**
Descriptive Statistics for Size and Performance, Executive Compensation, Board Size and Composition, and Company Sample Years and Executive Job Tenure by Mutual and Stock, Publicly Held, or Subsidiary

| Panel A: Size and Performance | | | | |
|---|---|---|---|---|
| | Mean | Median | Std. Dev. | *t*-test/kwallis[a] *p*-values |
| Mutual companies ($N = 531$) | | | | |
| Admitted assets ($M) | $29,650.20 | $13,286.73 | $42,076.46 | |
| Total premiums ($M) | $4,561.67 | $2,134.51 | $6,516.07 | |
| Number of subsidiaries | 4.27 | 3.00 | 4.85 | |
| ROA | 3.09 | 2.89 | 2.18 | |
| Publicly held stocks ($N = 543$) | | | | |
| Admitted assets ($M) | $22,176.13 | $11,390.68 | $32,630.20 | 0.0012/0.0529 |
| Total premiums ($M) | $3,423.36 | $1,800.32 | $4,419.71 | 0.0009/0.0467 |
| Number of subsidiaries | 12.51 | 8.00 | 14.18 | 0.0000/0.0001 |
| ROA | 3.88 | 2.79 | 5.45 | 0.0022/0.5923 |
| Subsidiary stocks ($N = 406$) | | | | |
| Admitted assets ($M) | $4,768.41 | $1,743.67 | $9,079.32 | 0.0000/0.0001 |
| Total premiums ($M) | $732.97 | $394.34 | $1,031.13 | 0.0000/0.0001 |
| Number of subsidiaries | 2.69 | 1.00 | 3.85 | 0.0000/0.0001 |
| ROA | 4.53 | 3.00 | 10.20 | 0.2059/0.2256 |

| Panel B: Executive Compensation[b] | | | | |
|---|---|---|---|---|
| | Mean | Median | Std. Dev. | *t*-test/kwallis[a] *p*-values |
| Mutual companies ($N = 531$) | $1,006,591 | $831,001 | $612,618 | |
| Publicly held stocks ($N = 543$) | $2,428,483 | $1,504,020 | $2,908,872 | 0.0000/0.0001 |
| Subsidiaries stocks ($N = 406$) | $1,241,154 | $901,512 | $1,257,673 | 0.0000/0.0001 |

| Panel C: Board Size and Composition | | | | |
|---|---|---|---|---|
| | Mean | Median | Std. Dev. | *t*-test/kwallis[a] |
| Mutual companies ($N = 531$) | | | | |
| Board size | 16.90 | 16.00 | 5.25 | |
| Number of outsiders | 14.26 | 14.00 | 5.03 | |
| Percentage of outsiders | 83.44 | 85.71 | 9.10 | |
| Publicly held stocks ($N = 543$) | | | | |
| Board size | 12.67 | 13.00 | 3.73 | 0.0000/0.0001 |
| Number of outsiders | 9.84 | 10.00 | 3.55 | 0.0000/0.0001 |
| Percentage of outsiders | 76.36 | 80.00 | 15.28 | 0.0000/0.0001 |
| Subsidiary stocks ($N = 406$) | | | | |
| Board size | 9.45 | 9.00 | 3.79 | 0.0000/0.0001 |
| Number of outsiders | 5.87 | 6.00 | 4.19 | 0.0000/0.0001 |
| Percentage of outsiders | 57.09 | 62.50 | 28.21 | 0.0000/0.0001 |

(*continued*)

**TABLE 1**
(Continued)

| Panel D: Distributions of Company Sample Years and Executive Job Tenure | | | | |
|---|---|---|---|---|
| | Mean | Median | Std. Dev. | *t*-test/kwallis[a] *p*-values |
| Mutual companies ($N = 531$) | | | | |
| Company years | 8.92 | 6.0 | 6.59 | |
| Executive job tenure | 4.52 | 4.0 | 2.78 | |
| Publicly held stocks ($N = 543$) | | | | |
| Company years | 8.40 | 7.00 | 5.05 | 0.5553/0.9111 |
| Executive job tenure | 5.26 | 5.00 | 3.71 | 0.0635/0.2895 |
| Subsidiary stocks ($N = 406$) | | | | |
| Company years | 5.65 | 4.50 | 3.35 | 0.0000/0.0002 |
| Executive job tenure | 3.67 | 3.00 | 2.49 | 0.0000/0.0004 |

*Notes:* The sample consists of 1,480 annual observations from 311 firms and 444 executives over the period 1974–1997 (227 stock companies with 949 annual observations and 83 mutual companies with 531 annual observations). The stock companies consist of 85 publicly held companies and 142 subsidiary companies (543 and 406 annual observations, respectively). Dollar amounts are expressed in 1997 dollars. Panel A: Admitted assets, total premiums, the number of subsidiaries, and the numerator of return on assets (ROA) (gain from operations before federal income taxes and dividends to policyholders) are obtained from A.M. Best's *Best's Insurance Reports: Life-Health* (*Property-Casualty*) and *Moody's*, various editions. Number of subsidiaries is a simple count. ROA is calculated as the ratio of operating income to beginning-of-year admitted assets times 100. Panel B: Total compensation is as reported in *The Insurance Forum*. *The Forum* gathers compensation information reported to the Nebraska insurance department, the New York insurance department, and contained in proxy statements filed with the Securities and Exchange Commission. The Nebraska insurance department numbers are described as total compensation, representing the total of cash, bonus, and "all other compensation." The New York insurance department numbers are described as all "salaries, compensation and emoluments." The Securities and Exchange Commission numbers are described as the total of salary, bonus, "other annual compensation," "restricted stock awards," "long-term incentive plan payouts," and "all other compensation." Panel C: Board size (the number of directors) and the number of outsiders are obtained from reading A.M. Best's *Best's Insurance Reports: Life-Health* (*Property-Casualty*) and *Moody's*, various editions. Outsiders are defined as nonofficer, nonfamily directors. We identify family directors as those that have the same last name as the CEO, president, or chairman of the board. Percentage of outsiders is the number of outsiders divided by board size times 100. Panel D: Company years is the number of years spanned by an individual company's data. Executive job tenure is the number of years spanned by an individual executive. Spanning can include more than one job title for an executive, for example, as CEO and as CEO and chairman.

[a]The *p*-values are for the two-sample *t*-test and Kruskal–Wallis (kwallis) equality of populations rank test comparing the means and distributions of mutual and publicly held stock companies and publicly held and subsidiary stock companies.

[b]See *The Insurance Forum* (August 1998, p. 66).

our return on asset (ROA) performance measure (ROA calculated as the ratio of operating income to beginning-of-year admitted assets).[16] Performance (measured

[16]Because mutuals do not have traded shares, we focus on an accounting-based measure of performance—ROA. Our ROA measure is based on statutory accounting principles (SAP)

by ROA) varies little across the three ownership structures, but size (measured either by admitted assets or total premiums) varies substantially. Based on either the two-sample *t*-test or the Kruskal–Wallis equality of populations rank test, mutuals are significantly larger than publicly held stocks. We also use the number of subsidiaries as a size measure—publicly held stocks have the largest number of subsidiaries, followed by mutuals and subsidiary stocks.

*Compensation Levels.* Panel B of Table 1 reports summary statistics (means, medians, and standard deviations) for executive compensation by ownership structure (mutual, publicly held stock, and subsidiary stock). Top executives of publicly held stocks have significantly higher compensation than either mutual company executives or executives of subsidiary companies.

Compensation levels and firm sizes differ from those reported in Mayers and Smith (1992). Our sample exhibits a lower average compensation level for mutual than stock executives.

This result differs from our earlier study, which reports lower compensation levels for mutual executives only after controlling for size. This difference perhaps is not surprising given the smaller differences in average size between stock and mutuals in this sample. We believe these differences result from the selection bias introduced by *The Insurance Forum's* focus on highly compensated executives.

*Board Structure.* Panel C of Table 1 provides statistics on board size and board composition. Board size is measured by the number of directors (total directors). Board composition is measured by the percentage of outside directors on the board (percent outside directors). We use as an instrument for outside directors, nonofficer, nonfamily directors.[17] Board sizes are larger for mutuals than for publicly held stock companies. (Means are 16.9 versus 12.67; medians are 16 versus 13; *t*-test and Kruskal–Wallis $p$-values $< 0.0001$.) The percentage of outsiders on the board also is larger for mutuals than for publicly held stock companies. (Means are 83.4 percent versus 76.4 percent; medians are 85.7 percent versus 80.0 percent; *t*-test and Kruskal–Wallis $p$-values $< 0.0001$.) Mayers, Shivdasani, and Smith (1997) report similar structural results for a sample of mutual and stock life insurance companies drawn from 1985.

since data are from reports filed with state regulatory agencies: mutuals are not publicly traded and thus do not file reports with the Securities and Exchange Commission. Their filings with state insurance commissioners employ SAP rather than GAAP. For life companies operating income is reported as "gain from operations before federal income taxes and dividends to policyholders." We calculate the equivalent for property–casualty companies.

[17] We assume family directors are those with the same last name as the CEO, president, or chairman. Baysinger and Butler (1985), Byrd and Hickman (1992), and others use proxy data to identify inside, outside, and affiliated directors. Affiliated directors include commercial bankers, investment bankers, lawyers, consultants, former employees, or directors with other business ties with the firm, in addition to family members. In their analyses, affiliated directors are grouped with insiders. We do not gather these data. In our study it would be expensive since only publicly traded companies report to the Securities and Exchange Commission, and hence proxy data are unavailable for mutuals and subsidiary stocks in our sample.

*Years in Sample.* Panel D of Table 1 provides statistics on certain time-series characteristics of our sample—the number of years spanned by an individual company's data (company years) and the number of years spanned by an individual executive (executive tenure). Mean and median company years for mutuals (8.9 and 6 years, respectively) are insignificantly different from those for publicly held stock companies (8.4 and 7 years, respectively). Executive tenure also is similar for mutuals and publicly held stocks (means are 4.5 versus 5.3 years; medians are 4 versus 5). Subsidiary stock companies, however, spend fewer years in the sample (mean and median are 5.7 and 4.5 years), and their executives have shorter tenure (mean and medians are 3.7 and 3 years, respectively).[18] The *t*-test and Kruskal–Wallis *p*-values indicate significance at better than the 0.001 level for tests comparing subsidiaries with either mutuals or publicly held stock companies.

*Compensation Regressions.* Table 2 reports pooled cross-sectional and time-series regressions of the natural logarithm of total compensation on economic determinants, board and ownership structure, and industry and year indicator variables to describe our data further.

Economic determinants are ROA, the log of admitted assets, the number of subsidiaries, executive tenure, and indicator variables for the executives' titles. For the stock subsidiaries, we include an indicator variable designating companies that are owned by mutuals.[19]

Board and ownership structure variables focus mainly on the structure of the board of directors: percentage of directors that are outsiders (percent outside directors) and board size. Percent outside directors is estimated as a piecewise linear function with a break point at 80 percent. We also include indicator variables for publicly held stock companies designating whether *Best's* reports that managers or outside shareholders have major controlling interests (management control and outside-shareholder control). For subsidiary stock companies, we include an indicator variable that equals one if the CEO also is an officer of the parent company or of an affiliated company (affiliated executive). These variables are suggested by Mayers and Smith (1992) and Core, Holthausen, and Larcker (1999).

Much of our Table 2 results are consistent with other evidence; for example, the estimated coefficients on the log of admitted assets for the three ownership forms are similar to those in Mayers and Smith (1992). As in Mayers and Smith, we find no evidence of a relation between compensation and ROA for mutuals. As in Ke, Petroni,

[18]Both fewer years in the sample for subsidiaries and shorter tenure for their executives likely reflect the selection bias introduced by *The Insurance Forum's* focus on highly compensated executives. Moreover, subsidiary CEOs can be promoted within a group of affiliated firms to CEO of a larger subsidiary or to an office at the parent firm. Thus, there are more avenues for career advancement available for subsidiary CEOs.

[19]Mayers and Smith (1992) argue that since mutual-owned stock companies and mutuals should operate similarly, mutual-owned subsidiary executives should receive lower compensation than executives of a similar stock-owned subsidiary.

**TABLE 2**
Regressions of Natural Logarithm of Total Compensation on Economic Determinants, Board and Ownership Structure Variables, and Year and Industry Controls

| | Mutuals | Publicly Held Stocks (Nonsubsidiaries) | Subsidiary Stocks (Subsidiaries) |
|---|---|---|---|
| Constant | 11.254 (26.50) | 11.421 (41.34) | 11.780 (57.09) |
| Economic determinants | | | |
| ROA | −0.005 (−0.72) | 0.019 (3.14) | 0.001 (0.31) |
| Log of admitted assets | 0.151 (8.03) | 0.240 (8.77) | 0.094 (4.90) |
| Number of subsidiaries | 0.016 (5.23) | 0.001 (0.81) | 0.001 (0.11) |
| Executive tenure | 0.040 (5.73) | 0.013 (1.37) | 0.030 (2.54) |
| Chairman | 0.033 (0.53) | 0.266 (1.83) | 0.114 (1.48) |
| Chairman, president | −0.137 (−1.02) | 0.231 (1.83) | 0.144 (1.41) |
| Chairman, CEO | 0.092 (2.52) | 0.387 (5.12) | 0.156 (1.51) |
| Chairman, president, CEO | 0.041 (0.89) | 0.416 (5.66) | −0.058 (−0.76) |
| Mutual owned | | | −0.094 (−0.88) |
| Board and ownership | | | |
| Management control | | 0.068 (0.12) | |
| Outside shareholder control | | −0.140 (−1.27) | |
| Affiliated executive | | | 0.139 (0.89) |
| Percent outside directors (≤80%) | −0.006 (−1.11) | −0.016 (−4.88) | 0.002 (1.87) |
| Percent outside directors (>80%) | 0.003 (0.72) | −0.001 (−0.14) | 0.001 (0.07) |
| Board size | 0.001 (0.24) | 0.029 (2.93) | −0.019 (−2.38) |
| Industry controls | | | |
| Life | −0.108 (−1.64) | 0.219 (2.23) | −0.037 (−0.59) |
| Life/property casualty | −0.024 (−0.30) | −0.035 (−0.38) | 0.153 (1.33) |
| Number of observations | 531 | 543 | 406 |
| $F$/prob > $F$ | 63.45/0.0000 | 26.12/0.0000 | 3.79/0.0000 |
| Adjusted $R^2$ | 0.73 | 0.46 | 0.16 |

*Notes:* Return on assets (ROA), admitted assets, number of subsidiaries, executive tenure, percent outside directors, and board size are as defined in Table 1. Other variables are indicator variables: chairman; chairman, president; chairman, CEO; chairman, president, CEO indicate the top officer's job title. Mutual owned indicates a stock subsidiary is owned by a mutual. Management control and outside shareholder control indicate there are major controlling interests (managers or outside shareholders) according to *Best's*. Affiliated executive indicates for subsidiary stocks if the top officer also is an officer of the parent or of an affiliated company. Life and life–property casualty indicate industry affiliation. Percent outside directors is estimated as a piecewise linear function with a break point at 80 percent. Coefficient estimates for year control indicator variables are suppressed. Separate estimations are presented for mutuals, publicly held stocks, and subsidiary stocks. The $t$-statistics are based on White (1980) standard errors. ($t$-statistics are in parentheses).

and Safieddine (1999), we report a positive relation between the log of CEO compensation and ROA for publicly held stocks, but no relation for subsidiary insurers.[20]

[20]Note that Mayers and Smith (1990) report that subsidiaries frequently obtain extensive reinsurance contracts from their parent companies. We suggest that this allows centralization of the asset-management function by the parent company. If subsidiary managers have little control of, or responsibility for, asset management, ROA would be a less appropriate measure of performance, and thus, this test would have less power for subsidiary stocks.

However, other results differ; for instance, unlike Mayers and Smith (1992), we find compensation is significantly (and positively) related to executive tenure for mutuals and subsidiary stocks, but there is no significant relation for publicly held stocks. We find that CEO compensation is higher for publicly held stock companies when the CEO also is board chair and when the board is larger, but lower when there is a greater percentage of outsiders on the board.[21] For subsidiary stocks, we find no evidence that holding the joint positions of CEO and board chair is important, and results for board composition are opposite from those for publicly held stocks—compensation is lower when the board is larger and higher when there is a greater percentage of outsiders on the board ($p$-value = 0.06).[22] The evidence from mutuals also differs, compensation is higher only when the CEO also is board chair.

### Measurement Problems

There are potentially severe problems in assessing pay-for-performance sensitivity when using data from common stock companies. In addition to salary changes and cash bonuses, managerial wealth changes that occur in response to changes in performance for stock companies often are generated by value changes in previously issued restricted stock, phantom stock, stock options, and stock appreciation rights (SARs). This raises two issues: the first is an accounting/data problem; the second is a statistical problem.

First, accounting rules, not economic principles, dictate much of the reporting of option, SAR, restricted stock, and phantom stock awards. For example, stock options and SARs normally are awarded with several years to expiration.[23] Yet their values frequently are recognized as compensation to the executive only at exercise, if at all. Restricted stock and phantom stock are not recognized as compensation for the executive until they are earned out. In such cases, reported compensation can reflect performance from periods prior to the initial award (if the award is made in response to performance) and can extend through the point when options are exercised or restrictions lapse.[24] These timing problems make it difficult to estimate pay-for-performance sensitivity because the link between performance and a manager's compensation is both variable and difficult to identify.

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[21] This result differs from that of Core, Holthausen, and Larcker (1999); in their examination of CEO compensation within industrial companies, they find that compensation is higher when there is a greater percentage of the board composed of outside directors as well as when the CEO also is board chair, and when the board is larger. The estimated (piecewise linear) function for percent of outside directors is downward sloping until the percentage of outsiders reaches 80 percent and is horizontal beyond.

[22] The construction of our board size and percent outsider variables are identical for both subsidiaries and publicly held stocks—outside board members are nonofficer, nonfamily directors. Yet for subsidiaries an outside board member is likely to be an officer of the parent company. Because the relevant contracting problem is between the subsidiary managers and the owners of the parent, parent officers appear well suited to be outside directors in a subsidiary.

[23] Stock options typically have 10-year lives with restrictions on exercising that lapse over 3 to 4 years (see, e.g., Ofek and Yermack, 2000, p. 1369).

[24] Restrictions usually lapse in 3 to 5 years (see Ofek and Yermack, 2000, p. 1370).

The second issue is estimated pay-for-performance sensitivities can be biased—pay-for-performance sensitivities calculated on the basis of option, SAR, restricted stock, or phantom stock awards can misstate the effective sensitivity of pay for performance. Executives have some control over their pay-for-performance sensitivity. For example, evidence suggests that executives' sales of unrestricted stock coincide with awards of restricted stock and the exercise of options (Ofek and Yermack, 2000). Furthermore, Wall Street offers executives swaps and collars that can modify pay-for-performance sensitivities materially (Bettis, Bizjak, and Lemmon, 2001). Thus, awards of stock-based incentive contracts can be ineffective in increasing pay-for-performance sensitivity.

Since mutuals have no alienable ownership rights, measurement problems associated with stock-based incentive compensation schemes are absent. Moreover, without alienable ownership rights, managers' abilities to alter their pay-for-performance sensitivity is more constrained. Finally, cash bonus awards, which are widely used by mutuals, are reported as compensation for the year of the award. Thus, timing problems between performance and its related compensation are more limited.

## BOARD STRUCTURE AND PAY FOR PERFORMANCE

We first examine the association between the structure of the board of directors and the degree to which executive compensation is tied to accounting performance. We extend our analysis to examine the *effectiveness hypothesis* and then examine the robustness of our results. For publicly held stock companies, our examination includes a stock market performance measure.

### The Complements Hypothesis

We estimate pooled cross-sectional and time-series regressions to assess the extent to which compensation is tied to accounting performance and whether the degree of association varies with board composition. We use first differences for dependent and independent variables to control for potential spurious correlations associated with nonstationary data series (Plosser and Schwert, 1978). By using first differences, we eliminate the need to control for any factors that affect executive compensation but do not vary over time.

We estimate two regressions for each ownership structure. The first establishes a benchmark; it regresses the year $t-1$ to $t$ first difference of the natural logarithm of top-executive total compensation ($\Delta comp$) on the year $t-1$ to $t$ first difference of the natural logarithm of total admitted assets ($\Delta asset$) and the year $t-1$ to $t$ first difference of the ROA ($\Delta roa$). The second regression is similar, but partitions the first difference in the ROA ($\Delta roa$) by categories of board composition.[25] Partitioning is accomplished by interacting the first difference in the ROA with indicator variables that are equal to one when the percentage of outsiders on the board falls within a particular range and zero otherwise. These ranges are described as *hi* when the percentage of outsiders is

[25]Board composition and CEO compensation structure are both policy choices by the firm and thus there is a potential simultaneous-equation bias. Here, we treat board composition as a predetermined variable and examine the sensitivity of compensation to accounting performance conditional on board structure.

equal to or greater than 85 percent, *mid* when less than 85 percent but greater than or equal to 75 percent, and *lo* when less than 75 percent.[26] Thus, the two regressions are

$$\Delta comp_{it} = a + b\,\Delta asset_{it} + c\,\Delta roa_{it} + e_{it}, \tag{1}$$

$$\Delta comp_{it} = a + b\,\Delta asset_{it} + c_h hi_{it} * \Delta roa_{it} + c_m mid_{it} * \Delta roa_{it} + c_l lo_{it} * \Delta roa_{it} + e_{it}. \tag{2}$$

Regression estimates are presented in Table 3: mutual companies in Panel A, publicly held stock companies in Panel B, and subsidiary stock companies in Panel C. Because we are dealing with panel data where fixed or random effects are potentially important, we estimate regressions that control for these problems.[27] We present, as our base case, results for models that account for fixed (company group) effects. These results are not materially different from untabulated results obtained assuming random effects, or no effects (i.e., using ordinary least squares [OLS]). Note that, the *F*-statistic (untabulated) for testing the joint significance of the company effects is never significant; the smallest *p*-value for this test for the regressions in Table 3 is 0.75.

The first regression in Panel A assesses the performance and compensation association for mutuals across the entire sample, and as in Mayers and Smith (1992), it provides only weak evidence of an association. But the second regression, which includes the board-structure partitions, implies a relation between board structure and the degree to which executive compensation is tied to accounting performance. It suggests that compensation is tied to accounting performance when the percentage of outsiders on the board is equal to or greater than 85 percent ($p$-value $< 0.01$). There is no evidence that compensation is tied to accounting performance in the lower partitions; moreover, there is evidence that the associations differ between the *hi* and *lo* partitions ($F$-test $p$-value $< 0.01$). Thus, our initial evidence is consistent with the complements hypothesis for mutual companies.

The first regression in Panel B suggests an association between the change in accounting performance and the change in compensation for publicly held stock companies—the coefficient estimate on $\Delta roa$ is positive and significant ($p$-value $< 0.05$). The second regression again shows that executive compensation is tied to performance for publicly held stock companies, but also that the evidence for a relation with board structure is weak. The coefficient estimates for the three-structure partitions are nonnegative, indicating significance for the *hi* partition but insignificance for the *mid* and *lo* partitions. These results are supportive of the complements hypothesis, yet pairwise *F*-test comparisons only weakly differentiate these

[26] We partition based on 75 percent and 85 percent to obtain a parsimonious distribution of observations for the *hi* and *lo* ranges for the three ownership types. The number of company-year observations in *hi*, *mid*, and *lo* are 213, 122, and 48 for the mutuals; 124, 163, and 124 for the publicly held stocks; and 50, 35, and 148 for the subsidiary stocks. We also partition on 80 percent and 90 percent. Results are qualitatively similar with this partition, but the categories are more unbalanced—for instance the *hi* group of subsidiary stocks contains only 21 observations.

[27] Our statistical software allows for unbalanced panels.

**TABLE 3**
Pooled Cross-Sectional and Time-Series Company Group Fixed-Effects Regressions of Year $t-1$ to $t$ Changes (First Differences) in the Natural Logarithm of Top-Executive Total Compensation ($\Delta comp$)

| Intercept | $\Delta asset$ | $\Delta roa$ | $\Delta roa * hi$ | $\Delta roa * mid$ | $\Delta roa * lo$ | $R^2$ |
|---|---|---|---|---|---|---|
| Panel A: Mutual Companies ($N = 383$) | | | | | | |
| 0.089 | 0.483 | 0.010 | | | | 0.03 |
| (4.74) | (2.90) | (0.86) | | | | |
| 0.090 | 0.479 | | 0.045 | −0.002 | −0.021 | 0.05 |
| (4.75) | (2.90) | | (2.71) | (−0.05) | (−1.30) | |
| Panel B: Publicly Held Stock Companies ($N = 411$) | | | | | | |
| Intercept | $\Delta asset$ | $\Delta roa$ | $\Delta roa * hi$ | $\Delta roa * mid$ | $\Delta roa * lo$ | $R^2$ |
| 0.127 | 0.161 | 0.022 | | | | 0.02 |
| (4.78) | (1.27) | (2.34) | | | | |
| 0.122 | 0.180 | | 0.038 | 0.017 | 0.004 | 0.03 |
| (4.57) | (1.41) | | (2.51) | (0.98) | (0.24) | |
| Panel C: Subsidiary Stock Companies ($N = 233$) | | | | | | |
| Intercept | $\Delta asset$ | $\Delta roa$ | $\Delta roa * hi$ | $\Delta roa * mid$ | $\Delta roa * lo$ | $R^2$ |
| 0.107 | 0.059 | 0.003 | | | | 0.00 |
| (1.87) | (0.16) | (0.29) | | | | |
| 0.110 | 0.067 | | −0. 002 | −0.028 | 0.023 | 0.01 |
| (1.89) | (0.18) | | (−0.17) | (−0.54) | (1.17) | |

*Notes:* Explanatory variables are: $\Delta asset$, the year $t-1$ to $t$ first difference in the natural logarithm of total admitted assets, and $\Delta roa$, the year $t-1$ to $t$ first difference in the return on assets. *Hi*, *mid*, and *lo* are indicator variables equal to one when the percent outsiders on the board of directors falls in a particular range, and zero otherwise: *hi* when equal to or greater than 85 percent, *mid* when less than 85 percent and greater than or equal to 75 percent, and *lo* when less than 75 percent. The asterisk indicates the variable is an interaction. (The *t*-statistics are in parentheses.)

coefficients ($p$-values $> 0.15$). Thus, evidence consistent with the complements hypothesis for publicly held stocks is weak.[28]

Finally, Panel C of Table 3 contains results for subsidiary stock companies. Like Ke, Petroni, and Safieddine (1999), we find no evidence of an association between pay and performance for executives of subsidiary insurers.

### Effectiveness Hypothesis

We examine two aspects of effectiveness. The first is that pay for performance is more effective for firms that operate in riskier lines of insurance. This aspect of effectiveness coupled with outside directors supplying more expertise in riskier lines potentially accounts for the observed relation between pay for performance and

[28]Since we have a one-sided alternative hypothesis, a one-tailed test is appropriate here, in which case the $p$-value is 0.08, which is still weak.

board composition. The second aspect is that pay for performance is more effective in larger firms—larger firms frequently are more complex. However, if the expertise demand for outside directors is smaller in larger firms and the fraction of outside directors is a positive function of firm size, then the observed relation between pay-for-performance sensitivity and board composition more likely is explained by the complements hypothesis.

*Lines of Insurance.* To examine the relations of compensation on lines of business and performance, we estimate pooled cross-sectional and time-series regressions of the year $t-1$ to $t$ first difference of the natural logarithm of top-executive total compensation ($\Delta comp$) on the year $t-1$ to $t$ first difference of the natural logarithm of total admitted assets ($\Delta asset$) and on the year $t-1$ to $t$ first difference of the ROA ($\Delta roa$) partitioned by lines of business. Partitioning is accomplished by interacting the first difference of the ROA with indicator variables that are equal to one when the firm operates in particular lines of insurance. Thus, the regression is

$$\Delta comp_{it} = a + b\Delta asset_{it} + \Sigma_l d_l line_{li} * \Delta roa_{it} + eit, \tag{3}$$

where $line_l$ is an indicator variable designating life, property casualty, or life and property casualty. Regression estimates with company group fixed effects are presented as the first model in each panel of Table 4: mutual companies in Panel A, publicly held stock companies in Panel B, and subsidiary stock companies in Panel C. These results are not materially different from untabulated results obtained assuming random effects or using ordinary least squares. The $F$-statistic (untabulated) for testing the joint significance of the company effects is never significant—the smallest $p$-value for this test for the regressions in Table 4 is 0.81.

The regression results reported in Panel A provide no evidence of an association between pay and accounting performance for mutual companies that varies by line of business. The evidence in Panel B, however, suggests that pay is tied to accounting performance for publicly held stock companies that operate in either life insurance ($p$-value $< 0.10$) or property–casualty insurance ($p$-value $< 0.05$). But, there is no evidence that publicly held stock companies operating in both life and property–casualty insurance tie pay to accounting performance.[29] Finally, there is no evidence in Panel C of an association between pay and accounting performance for any of the three line-of-business categories for subsidiary stock companies.

*Firm Size.* The effectiveness of pay for accounting performance in larger firms (because they are more complex) along with outside directors being more prevalent in larger firms potentially explains our results. To examine this aspect more carefully, we estimate the following regression for each ownership type:

$$\Delta comp_{it} = a + b\Delta asset_{it} + d_b large_{it} * \Delta roa_{it} + d_s small_{it} * \Delta roa_{it} + e_{it}. \tag{4}$$

[29]The number of company-year observations in life, property casualty, and life and property casualty are 296, 33, and 54 for the mutuals; 144, 39, and 228 for the publicly held stocks; and 118, 82, and 33 for the subsidiary stocks.

**TABLE 4**
Pooled Cross-Sectional and Time-Series Company Group Fixed-Effects Regressions of Year $t-1$ To $t$ Changes (First Differences) in the Natural Logarithm of Top-Executive Total Compensation ($\Delta comp$)

| | Intercept | $\Delta asset$ | $\Delta roa * life$ | $\Delta roa * p\text{-}c$ | $\Delta roa * life/p\text{-}c$ | $\Delta roa * large$ | $\Delta roa * small$ | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| Panel A: Mutual Companies ($N = 383$) | | | | | | | | |
| (1) | 0.091 | 0.476 | 0.023 | 0.001 | 0.011 | | | 0.03 |
| | (4.79) | (2.84) | (1.16) | (0.10) | (0.37) | | | |
| (2) | 0.089 | 0.490 | | | | 0.022 | 0.004 | 0.03 |
| | (4.69) | (2.93) | | | | (1.06) | (0.004) | |
| Panel B: Publicly Held Stock Companies ($N = 411$) | | | | | | | | |
| (1) | 0.131 | 0.173 | 0.034 | 0.075 | 0.006 | | | 0.04 |
| | (4.95) | (1.00) | (1.91) | (2.75) | (0.51) | | | |
| (2) | 0.124 | 0.181 | | | | 0.038 | 0.016 | 0.03 |
| | (4.66) | (1.41) | | | | (2.06) | (1.42) | |
| Panel C: Subsidiary Stock Companies ($N = 233$) | | | | | | | | |
| (1) | 0.107 | 0.041 | −0.001 | 0.011 | 0.029 | | | 0.01 |
| | (1.85) | (0.11) | (−0.12) | (0.58) | (0.66) | | | |
| (2) | 0.104 | 0.019 | | | | 0.711 | 0.002 | 0.03 |
| | (1.82) | (0.05) | | | | (2.23) | (0.25) | |

*Notes:* Explanatory variables are: $\Delta asset$, the year $t-1$ to $t$ first difference in the natural logarithm of total admitted assets, and $\Delta roa$, the year $t-1$ to $t$ first difference in the return on assets. *Life, p-c*, and *life/p-c* are indicator variables equal to one when the firm is classified as doing business in life, property casualty, or both, respectively. *Large* and *small* are indicator variables equal to one if the natural logarithm of admitted assets is greater or less than the pooled-sample median, respectively, and zero otherwise. The asterisk indicates the variable is an interaction. (The *t*-statistics are in parentheses.)

*Large* (*small)* is an indicator variable that equals one if the natural logarithm of admitted assets is greater (less) than the pooled sample median, and zero otherwise. Other variables are as described above. Company group fixed-effects regression estimates are presented as the second model in each panel of Table 4. Reported results are, with one exception, not materially different from untabulated results obtained assuming random effects or using OLS. *F*-statistics (untabulated) for testing the joint significance of the company effects are never significant—the smallest *p*-value for this test for these regressions is 0.81.

Panel B contains the regression estimate for publicly held stocks. It suggests that pay for performance is associated with large firms and, at least marginally, not small firms. We also examine the board composition and size relation for publicly held stock companies.[30] We find that larger insurers appoint more outside directors. This

[30]We estimate, but do not tabulate, pooled time-series and cross-sectional regressions of board composition (the percentage of directors that are outsiders) on firm size (log of admitted assets) with industry and company dummy variables (fixed effects). These regressions show

suggests the monitoring demand is more important than the expertise demand for explaining board composition for publicly held stocks, a result consistent with the complements hypothesis.

Panels A and C contain the mutual and subsidiary stock company regression estimates, respectively. There is no evidence that pay for accounting performance is associated with size for mutual companies, but there is some evidence supporting this hypothesis for subsidiary stock companies. The evidence suggests pay-for-performance sensitivity is stronger in larger subsidiaries[31] ($p$-value $< 0.05$). This is the only case where we find a difference in inferences obtained among random effects, fixed effects, or OLS models—the alternate models suggest no association between pay-for-performance sensitivity and size for subsidiary companies.

Thus, for mutuals our evidence suggests the importance of board structure for the degree of pay for accounting performance. Our mutual evidence offers little support for the effectiveness hypotheses in that pay for accounting performance for these firms is not associated with specific lines of business or firm size. For publicly held stock companies that are large or that operate in just life or property–casualty insurance, our evidence is consistent with pay-for-performance effectiveness. We find only weak evidence for these companies, suggesting the structure of the board of directors is important for the extent to which executive compensation is tied to accounting performance. Finally, for subsidiary stock companies, we find evidence of pay for accounting performance only for large subsidiaries; partitioning the sample by specific lines of business or the structure of the board provides no evidence of pay-for-performance sensitivity. Since our interests center on the complements hypothesis and the subsidiary stock company evidence is weak, we omit this group from our robustness examination.

## Robustness Checks

*Functional Form Specifications.* Table 5 reports company group fixed-effects regression evidence on the robustness of our results. This evidence consists of a selection of models that simultaneously assess intercept as well as slope indicator variables for various partitions that are significant in the specifications we examine.[32] Panel A contains results for mutuals and Panel B for publicly held stock companies.

Several CEO compensation studies report results from median or robust regressions to deal with outliers.[33] We report median regression results in Table 6 (we use the

a positive and significant ($p$-value $< 0.001$) firm-size relation for publicly held stock companies and a negative but insignificant ($p$-value $> 0.10$) relation for mutual companies.

[31]Mayers and Smith (1990) report that smaller firms reinsure more than larger firms. This suggests that ROA would be a more appropriate measure of managerial performance for larger subsidiary firms.

[32]The property–casualty intercept indictor variable is omitted from the Table 5 fixed-effects regressions to avoid singularity.

[33]See, for example, Aggarwal and Samwick (1999), Hall and Liebman (1998), and Jin (2002). Jin reports median, robust, and OLS regressions. Median regressions minimize the sum of absolute deviations instead of the sum of squared deviations. Robust regression methods handle outliers by performing an initial screening to eliminate gross outliers and then following an iterative method that minimizes a weighted sum of squared errors. See Street, Carroll, and Ruppert (1988) for details on robust regression.

**TABLE 5**
Pooled Cross-Sectional and Time-Series Company Group Fixed-Effects Regressions of Year $t-1$ to $t$ changes (First Differences) in the Natural Logarithm of Top-Executive Total Compensation ($\Delta comp$) on Explanatory Variables

| Panel A: Mutual Companies ($N = 383$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Intercept | *hi* | *life* | *p-c* | *large* | $\Delta asset$ | $\Delta roa$ | $\Delta roa * hi$ | $\Delta roa * life$ | $\Delta roa * p\text{-}c$ | $\Delta roa * large$ | $R^2$ |
| 0.116 | −0.030 | −0.031 | | 0.018 | 0.498 | −0.058 | 0.078 | 0.018 | 0.036 | 0.027 | 0.06 |
| (1.06) | (−0.76) | (−0.24) | | (0.35) | (2.96) | (−1.51) | (2.94) | (0.93) | (0.93) | (1.12) | |
| 0.090 | −0.028 | | | 0.020 | 0.496 | −0.045 | 0.077* | | 0.022 | 0.029 | 0.06 |
| (2.18) | (−0.72) | | | (0.39) | (2.95) | (−1.66) | (2.92) | | (0.84) | (1.17) | |
| 0.118 | −0.029 | −0.032 | | 0.020 | 0.486 | −0.026 | 0.067 | −0.007 | | 0.020 | 0.06 |
| (1.08) | (−0.76) | (−0.25) | | (0.39) | (2.90) | (−1.49) | (2.81)* | (−0.27) | | (1.18) | |
| 0.094 | −0.030 | | | 0.019 | 0.484 | −0.027 | 0.065** | | | 0.028 | 0.06 |
| (2.31) | (−0.77) | | | (0.37) | (2.89) | (−1.58) | (2.93) | | | (1.17) | |
| 0.107 | −0.031 | | | | 0.466 | −0.017 | 0.061** | | | | 0.05 |
| (3.63) | (−0.82) | | | | (2.81) | (−1.14) | (2.77) | | | | |

(*continued*)

**TABLE 5**
(Continued)

| Panel B: Publicly Held Stock Companies ($N = 411$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Intercept | *hi* | *life* | *p-c* | *large* | $\Delta asset$ | $\Delta roa$ | $\Delta roa * hi$ | $\Delta roa * life$ | $\Delta roa * p\text{-}c$ | $\Delta roa * large$ | $R^2$ |
| 0.089 | 0.089 | 0.100 | | −0.050 | 0.163 | −0.009 | 0.012 | 0.031 | 0.060* | 0.030 | 0.05 |
| (0.79) | (1.41) | (0.35) | | (−0.59) | (1.25) | (−0.54) | (0.56) | (1.35) | (1.95) | (1.35) | |
| 0.124 | 0.095 | | | −0.055 | 0.166 | 0.001 | 0.016 | | 0.048 | 0.023 | 0.05 |
| (2.35) | (1.50) | | | (−0.65) | (1.28) | (0.09) | (0.78) | | (1.65) | (1.07) | |
| 0.093 | 0.091 | 0.101 | | −0.070 | 0.194 | −0.002 | 0.024 | 0.018 | | 0.028 | 0.04 |
| (0.82) | (1.43) | (0.35) | | (−0.84) | (1.50) | (−0.15) | (1.20) | (0.84) | | (1.25) | |
| 0.128 | 0.095 | | | −0.071 | 0.192 | 0.003 | 0.026* | | | 0.024 | 0.04 |
| (2.42) | (1.49) | | | (−0.84) | (1.49) | (0.23) | (1.27) | | | (1.09) | |
| 0.098 | 0.080 | | | | 0.177 | 0.010 | 0.027** | | | | 0.03 |
| (3.00) | (1.28) | | | | (1.40) | (0.82) | (1.33) | | | | |

*Notes:* $\Delta asset$ is the year $t - 1$ to $t$ first difference in the natural logarithm of total admitted assets, and $\Delta roa$ is the year $t - 1$ to $t$ first difference in the return on assets. *High* is an indicator variable equal to one when the percent outsiders in the board of directors is greater than 85 percent. *Life* and *p-c* are indicator variables equal to one when the firm is classified as doing business in life or property–casualty insurance, and zero otherwise. *Large* is an indicator variable equal to one if admitted assets are greater than the pooled-sample median, and zero otherwise. An asterisk in the column headings indicates the variable is an interaction. (The *t*-statistics are in parentheses.)

* and ** indicate the *F*-test for the sum of the coefficients on the specified interaction variable and $\Delta roa$ is significant at the 0.10 or 0.05 level, respectively.

**TABLE 6**
Pooled Cross-Sectional and Time-Series Median Regressions of Year $t - 1$ to $t$ Changes (First Differences) in the Natural Logarithm of Top-Executive Total Compensation ($\Delta comp$) on Explanatory Variables

| Panel A: Mutual Companies ($N = 383$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Intercept | *hi* | *life* | *p-c* | *large* | $\Delta asset$ | $\Delta roa$ | $\Delta roa * hi$ | $\Delta roa * life$ | $\Delta roa * p\text{-}c$ | $\Delta roa * large$ | Pseudo $R^2$ |
| 0.100 | 0.009 | −0.037 | −0.034 | 0.040 | 0.288 | −0.031 | 0.053 | 0.023 | 0.018 | 0.011 | 0.03 |
| (2.35) | (0.36) | (−1.03) | (−0.64) | (1.59) | (2.35) | (−1.11) | (2.46) | (0.84) | (0.67) | (0.55) | |
| 0.066 | 0.002 | | −0.029 | 0.047 | 0.335 | −0.021 | 0.066** | | 0.003 | 0.023 | 0.03 |
| (2.50) | (0.09) | | (−0.65) | (1.83) | (2.51) | (−0.94) | (2.93) | | (0.13) | (1.14) | |
| 0.087 | 0.013 | −0.023 | | 0.047 | 0.238 | −0.024 | 0.060** | 0.007 | | 0.020 | 0.03 |
| (2.80) | (0.56) | (−0.87) | | (2.07) | (2.03) | (−1.80) | (3.27) | (0.34) | | (1.09) | |
| 0.067 | 0.006 | | | 0.048 | 0.287 | −0.014 | 0.055** | | | 0.013 | 0.03 |
| (2.86) | (0.23) | | | (2.01) | (2.34) | (−1.02) | (3.02) | | | (0.71) | |
| 0.102 | −0.012 | | | | 0.301 | −0.001 | 0.036** | | | | 0.02 |
| (5.80) | (−0.57) | | | | (2.92) | (−0.14) | (2.40) | | | | |

(*continued*)

**TABLE 6**
(Continued)

| Panel B: Publicly Held Stock Companies ($N = 411$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Intercept | *hi* | *life* | *p-c* | *large* | Δ*asset* | Δ*roa* | Δ*roa* ∗ *hi* | Δ*roa* ∗ *life* | Δ*roa* ∗ *p-c* | Δ*roa* ∗ *large* | Pseudo $R^2$ |
| 0.082 | 0.098 | −0.019 | −0.042 | 0.032 | 0.141 | −0.003 | 0.001 | 0.009 | 0.060** | 0.032** | 0.05 |
| (3.40) | (3.86) | (−0.73) | (−1.05) | (1.34) | (2.30) | (−0.34) | (0.06) | (0.82) | (4.31) | (2.92) | |
| 0.071 | 0.103 | | −0.031 | 0.039 | 0.147 | 0.006 | 0.004 | | 0.052** | 0.031** | 0.05 |
| (4.48) | (5.08) | | (−1.04) | (2.07) | (3.01) | (1.03) | (0.51) | | (6.19) | (3.56) | |
| 0.061 | 0.094 | 0.002 | | 0.048 | 0.139 | 0.005 | 0.008 | 0.001 | | 0.039** | 0.04 |
| (2.58) | (3.59) | (0.07) | | (1.93) | (2.21) | (0.67) | (0.78) | (0.13) | | (3.35) | |
| 0.063 | 0.095 | | | 0.047 | 0.130 | 0.005 | 0.008 | | | 0.039** | 0.04 |
| (3.4) | (3.86) | | | (2.07) | (2.21) | (0.81) | (0.81) | | | (3.61) | |
| 0.079 | 0.096 | | | | 0.148 | 0.008 | 0.002 | | | | 0.03 |
| (4.88) | (3.71) | | | | (2.36) | (1.27) | (0.21) | | | | |

*Notes:* Δ*asset* is the year $t - 1$ to $t$ first difference in the natural logarithm of total admitted assets, and Δ*roa* is the year $t - 1$ to $t$ first difference in the return on assets. *High* is an indicator variable equal to one when the percent outsiders in the board of directors is greater than 85 percent. *Life* and *p-c* are indicator variables equal to one when the firm is classified as doing business in life or property–casualty insurance, and zero otherwise. *Large* is an indicator variable equal to one if admitted assets are greater than the pooled-sample median, and zero otherwise. An asterisk in the column headings indicates the variable is an interaction. (The *t*-statistics are in parentheses.)

* and ** indicate the *F*-test for the sum of the coefficients on the specified interaction variable and Δ*roa* is significant at the 0.10 or 0 .05 level, respectively.

same format as Table 5). Robust regression results (not tabulated) are qualitatively similar to those obtained from the median regressions.

Our results for mutuals in Panel A of Table 5 are consistent with results in Tables 3 and 4. The estimated coefficients on the board-structure interaction with the first difference of the ROA ($\Delta roa * hi$) are positive, relatively stable, and significant ($p$-values $< 0.05$) across the various specifications we examine. The sums of these coefficients with the coefficient on the first difference in the ROA ($\Delta roa$) also are significant, at least in the last two specifications. None of the other interactions with the change in performance, indicating lines of insurance or firm size, are significant. The median regression results reported in Panel A of Table 6 are, if anything, stronger.

The results for publicly held stock companies reported in Table 5 are attenuated from those we report in Tables 3 and 4. There is evidence of significant pay-for-performance correlation only for firms that operate in property–casualty insurance. In the various specifications, the estimated coefficient on this slope partition is positive, relatively stable, and significant ($p$-values $< 0.10$). The sum of this coefficient with the coefficient on the first difference in the ROA ($\Delta roa$) also is significant in the first regression. But also there is no evidence that the structure of the board of directors is associated with tying executive compensation to accounting performance—the slope indicator variable that focuses on the structure of the board ($\Delta roa * hi$) is never significant. These results are reinforced by the median regressions reported in Table 6. The major difference in Table 6 is that the partition that focuses on large firms ($\Delta roa * large$) is significant. Therefore, the median-regression results suggest importance of the effectiveness hypothesis for publicly held stock companies that are large or operate in property–casualty insurance.

*Estimation Methods.* We subject the models of Tables 5 and 6 to additional specifications, which we do not tabulate. We estimate OLS regressions and company group random-effects regressions as well as additional fixed-effects regressions where we specify group effects for time, and companies and time. Tests are performed with both OLS and White (1980) standard errors. The results for mutuals in these alternative specifications are qualitatively the same as those we report: there is evidence of significant pay for performance when the fraction of outsiders on the board is greater than 85 percent.

As shown, when company group fixed effects are specified, there is some attenuation of the publicly held stock company results: there is still evidence of significant pay-for-performance correlation for firms that operate in property–casualty insurance, but the evidence for large firms is weak. For all specifications that do not involve company group fixed effects, we find supporting evidence for significant pay-for-performance correlation for large firms as well as firms that operate in property casualty lines.

We also estimate the models using generalized least squares allowing AR(1) autocorrelation within panels. These results are qualitatively the same as those from the median regressions reported in Table 6. Finally, instead of grouping by ranges of board structure, we put the percentage of outsiders on the board as an interaction with the first difference in the ROA. We get the same qualitative results with this alternative specification.

**TABLE 7**
Pooled Cross-Sectional and Time-Series Company Group Fixed-Effects Regressions for Publicly Held Stock Companies of year $t-1$ to $t$ Changes (First Differences) in the Natural Logarithm of Top-Executive Total Compensation ($\Delta comp$) on Explanatory Variables

| Model | Intercept | $\Delta asset$ | $car$ | $lagcar$ | $\Delta roa$ | $lag\Delta roa$ | $N$ | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.127 | 0.161 | | | 0.022 | | 411 | 0.02 |
| | (4.78) | (1.27) | | | (2.34) | | | |
| 2 | 0.138 | 0.265 | 0.331 | | | | 384 | 0.05 |
| | (4.54) | (1.78) | (3.42) | | | | | |
| 3 | 0.133 | 0.101 | | | 0.019 | 0.013 | 353 | 0.01 |
| | (4.59) | (0.69) | | | (1.60) | (1.20) | | |
| 4 | 0.145 | 0.257 | 0.308 | 0.126 | | | 379 | 0.05 |
| | (4.68) | (1.72) | (3.13) | (1.42) | | | | |
| 5 | 0.142 | 0.221 | 0.316 | | 0.021 | | 384 | 0.06 |
| | (4.70) | (1.48) | (3.27) | | (2.01) | | | |
| 6 | 0.164 | 0.120 | 0.272 | 0.118 | 0.020 | 0.009 | 330 | 0.04 |
| | (4.72) | (0.72) | (2.36) | (1.11) | (1.55) | (0.75) | | |

*Notes:* $\Delta asset$ is the year $t-1$ to $t$ first difference in the natural logarithm of total admitted assets, $\Delta roa$ is the year $t-1$ to $t$ first difference in the return on assets (ROA), $car$ is the contemporaneous market-adjusted cumulative annual return, $lag\Delta roa$ is the 1-year lagged first difference in the ROA, and $lagcar$ is the 1-year lagged market-adjusted cumulative annual return. (The $t$-statistics are in parentheses.)

*Publicly Held Stocks.* Our positive complements hypothesis results are about mutual companies; we argue measurement problems should be less severe for these companies than for stock companies. Results for publicly held stock companies supporting the effectiveness hypothesis and not the complements hypothesis are therefore more tenuous—because of potential measurement problems, and because stock market performance can be relevant for those firms. To examine pay for performance in publicly held stock companies further, we calculate a stock market performance measure: annual market-adjusted excess returns using data from the Center for Research in Security Prices (CRSP).[34]

Table 7 reports pooled cross-sectional and time-series company group fixed-effects regression estimates that describe the relations between the year $t-1$ to $t$ first difference of the natural logarithm of top-executive total compensation ($\Delta comp$) on the year $t-1$ to $t$ first difference of the natural logarithm of total admitted assets ($\Delta asset$) and on two performance variables: the year $t-1$ to $t$ first difference on the ROA ($\Delta roa$) and the contemporaneous market-adjusted cumulative annual return ($car$). Also included as explanatory variables are 1-year lagged performance measures ($lag\Delta roa$ and $lagcar$). The first two regressions show that market-adjusted cumulative stock returns explain more of the variation in $\Delta comp$ than does the accounting measure. The $R^2$ in

[34] We identify CRSP permanent numbers for 83 of our 85 publicly held stock companies. Market-adjusted excess returns are calculated as the difference between the stock's annual cumulative return and the corresponding annual return of the CRSP equally weighted rate of return index.

**TABLE 8**
Pooled Cross-Sectional and Time-Series Company Group Fixed-Effects (Panel A) and Median (Panel B) Regressions for Publicly Held Stock Companies of Year $t-1$ to $t$ Changes (First Differences) in the Natural Logarithm of Top-Executive Total Compensation ($\Delta comp$) on Explanatory Variables

| Panel A: Company Group Fixed-Effects Regression ($N = 384$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Intercept | *hi* | *life* | *p-c* | *large* | $\Delta asset$ | *car* | *car* ∗ *hi* | *car* ∗ *life* | *car* ∗ *p-c* | *car* ∗ *large* | $R^2$ |
| 0.109 | 0.097 | 0.072 | | −0.041 | 0.263 | 0.238 | −0.135 | −0.063 | 0.373 | 0.223** | 0.07 |
| (0.94) | (1.41) | (0.25) | | (−0.48) | (1.75) | (1.26) | (−0.58) | (−0.31) | (0.91) | (1.12) | |
| Panel B: Median Regression ($N = 384$) | | | | | | | | | | | |
| Intercept | *hi* | *life* | *p-c* | *large* | $\Delta asset$ | *car* | *car* ∗ *hi* | *car* ∗ *life* | *car* ∗ *p-c* | *car* ∗ *large* | $R^2$ |
| 0.078 | 0.101 | −0.017 | 0.015 | 0.067 | 0.107 | 0.184 | −0.079 | −0.079* | 0.273** | 0.222** | 0.05 |
| (4.07) | (4.94) | (−0.84) | (0.39) | (3.45) | (2.06) | (2.84) | (−0.98) | (−1.18) | (1.87) | (3.45) | |

*Notes:* $\Delta asset$ is the year $t-1$ to $t$ first difference in the natural logarithm of total admitted assets, *car* is the market-adjusted contemporaneous cumulative annual return, *Hi* is an indicator variable equal to one when the percent outsiders in the board of directors is greater than 85 percent. *Life* and *p-c* are indicator variables equal to one when the firm is classified as doing business in life or property–casualty insurance, and zero otherwise. *Large* is an indicator variable equal to one if admitted assets are greater than the pooled-sample median, and zero otherwise. An asterisk in the column headings indicates the variable is an interaction. (The *t*-statistics are in parentheses.)

* and ** indicate the *F*-test for the sum of the coefficients on the specified interaction variable and *car* is significant at the 0.10 or 0.05 level, respectively.

regression 2 where *car* is the explanatory variable is approximately two and a half times that in regression 1 where $\Delta roa$ is the explanatory variable. There is only weak evidence that lagged performance measures are important (regressions 3, 4, and 6), with the strongest evidence supporting the lagged accounting measure in regression 3. There also is evidence (regressions 5 and 6) that both performance measures are important.

We reestimate our pay-for-performance regressions for publicly held stock companies using market-adjusted cumulative stock returns as the performance measure. Summary results of this analysis are reported in Table 8.[35] We find no evidence that the structure of the board of directors is associated with tying executive compensation to stock market performance. In untabulated regressions corresponding to those in Tables 3 and 4, we find evidence of significant pay-for-performance sensitivity in all partitions examined. The Table 8 regressions provide evidence suggesting that pay-for-performance sensitivity is greater for large firms and firms that operate in property–casualty insurance. This evidence is significant in the Panel B median regression ($p$ values $< 0.10$); these results support the effectiveness hypothesis but not the complements hypothesis for publicly held stock companies.

## CONCLUSIONS

The insurance industry includes both stock and mutual companies. These ownership structures specify different contracting relations among the various claimholders—customers, owners, and managers—and thus involve different incentive conflicts among these groups. Various governance mechanisms to control these incentive conflicts have been examined, but prior analyses generally focus on a single mechanism. For example, Mayers and Smith (1992) examine executive compensation within the insurance industry. They report evidence of pay-for-accounting performance in stock insurers but not in mutual companies. Moreover, inalienability of mutual ownership claims restricts corporate control mechanisms like capital market monitoring, stock-based incentive compensation, and the external takeover market. These limitations increase the importance of monitoring by independent directors and drive mutuals to use more independent directors than stocks (Mayers, Shivdasani, and Smith, 1997).

Monitoring by independent board members and incentive compensation provisions in executive pay packages are alternative mechanisms for controlling incentive problems between owners and managers. The complements hypothesis suggests that if incentive conflicts vary materially, those firms with more outside directors also should implement a higher degree of pay-for-performance sensitivity. Our evidence is consistent with this complements hypothesis. By examining these mechanisms jointly, we document a relation between board structure and the extent to which executive compensation is tied to performance in mutuals: compensation changes are significantly more sensitive to changes in ROA when the fraction of outsiders on the board is high.

[35]The property–casulty intercept indicator variable is omitted from the Tabel 8 fixed-effects regression to avoid singularity.

For stock companies, our evidence differs. For publicly held stock companies, we find a significant correlation between compensation changes and changes in ROA for firms that operate in property–casualty lines as well as firms that are large. We document similar results using stock market performance. But we find only weak evidence of a relation between board structure and the extent to which executive compensation is tied to performance for stocks. Finally, we find evidence of a pay-for-performance correlation only for large subsidiary stock companies.

Our results provide useful evidence in support of the complements hypothesis. We find a significant association between pay-for-performance sensitivity and board composition among mutual insurers—the case where we expect our tests have greatest power. Our analysis also identifies variation in the data that would not be predicted by the complements hypothesis. These results suggest that the effectiveness hypothesis and the risk-aversion hypothesis as well as differing roles played by the board among mutuals, publicly held stocks, and subsidiary stocks explain aspects of the observed variation. With our data, we are unable to distinguish among these alternative explanations.

Baker, Jensen, and Murphy (1988, p. 614) argue there are insufficient incentives to structure efficient compensation contracts for executives of stock companies: "Boards of directors, who often own only a trivial fraction of their firm's common stock, . . . personally bear a disproportionately large share of the nonpecuniary costs, but receive essentially none of the pecuniary benefits." In mutuals, directors' pecuniary incentive to enhance firm value must be small. Nonetheless, our results for mutuals suggest outside directors who constitute a large majority are motivated to tie executive compensation to performance.

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