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Managerial Discretion and Corporate Governance in Publicly Traded Firms: Evidence From the Property–Liability Insurance Industry

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Abstract

We study the incremental impact of corporate governance in mitigating managerial discretion, controlling for incentive alignment of managerial ownership. We extend the managerial discretion hypothesis to predict that for firms with the same set of governance tools, those that utilize governance tools more stringently to control agency costs will command greater contracting cost advantages, leading them to specialize in business with greater managerial discretion. Using 72 publicly traded insurers from 1994 to 2006, we find evidence supporting our hypothesis. Our findings complement the finance literature that focuses on the role of financing policies in mitigating agency costs of managerial discretion.

Introduction

We study the incremental impact of corporate governance controls in mitigating managerial discretion costs after controlling for the incentive alignment of managerial ownership. To accomplish this, we apply the managerial discretion hypothesis (MDH) of Mayers and Smith (1981, 1988, 1994) to publicly traded, property–liability (P&L) insurance companies and investigate whether systematic variation in governance controls exists across different levels of managerial discretion. Mayers and Smith (1981) develop the MDH to explain the coexistence of alternative ownership structures within the insurance industry. The insurance industry is complex and unique. Multiple ownership structures (e.g., stocks, mutuals, Lloyds associations, and reciprocals) coexist. Additionally, the industry generates revenue through the sale of distinct types (i.e., lines) of insurance, which can differ substantially from one another in the amount of managerial discretion required. For example, medical malpractice insurance, being long-tailed and with large loss variability, faces substantial uncertainty in pricing, underwriting, claim settlement, and reserving; hence, managerial discretion significantly impacts the success of these functions (Rizzo, 1989; Lamm-Tennant,

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Starks, and Stokes, 1992; Petroni and Beasley, 1996). In contrast, auto–physical damage insurance, being short-tailed and more static in nature, requires far less managerial discretion to conduct the same business functions.[1] Mayers and Smith recognize that alternative ownership structures have different sets of governance tools to mitigate agency costs. Specifically, stock insurers have governance tools, such as managerial ownership, stock-based compensation, external blockholders, and the takeover market, which are not available to other ownership structures (e.g., mutuals). This leads Mayers and Smith (1981, p. 427) to argue that firms with varying abilities to manage agency costs should experience competitive advantages in different lines of insurance: "... if the cost of controlling management in mutual insurance companies is higher than in stock firms, then mutuals should be more prevalent in lines of insurance where management exercises little discretion...." Therefore, the MDH predicts line specialization across ownership structures.

Our study extends the MDH to explore whether, within the single ownership structure of publicly traded stock insurers, variation in stringency of corporate governance systems generates similar comparative advantages and line specialization. Specifically, Mayers and Smith predict that firms with a more robust set of governance tools will specialize in high managerial discretion business. We extend their theory to predict that within a group of firms having the *same* set of governance tools, those that utilize these tools more stringently to control agency costs will command greater contracting cost advantages, leading them to specialize in lines of insurance that require higher levels of managerial discretion.

This extension is important because, by focusing on publicly traded insurers, these results become applicable to publicly traded firms outside the insurance industry. In addition, the focus on a more homogenous group (i.e., solely publicly traded insurers) allows us to gain a deeper understanding of firms' business and governance decisions. A firm's operating environment is dynamic, whereas its ownership structure is relatively static. Once a firm is incorporated, it is costly to switch to another ownership structure. Thus, firms need to rely more on governance controls (e.g., executive compensation and board structure) than ownership structure to control agency costs.[2]

The root cause of agency costs due to managerial discretion is the separation of ownership and control. Indeed, scholars sometimes equate agency costs of managerial discretion to agency costs due to the separation of ownership and control (Colquitt, Sommer, and Godwin, 1999). In our study, we make a subtle, but significant

[1] The distinction between "long-tail" and "short-tail" lines of insurance lies in the length of time elapsed between the policy inception and loss payment date. For example, medical malpractice, workers' compensation, and officers and directors liability are long-tail lines of insurance, while fire, homeowner's peril, and automobile physical damages are short-tail lines (Weiss, 1991; Cummins, Weiss, and Zi, 1999).

[2] Supporting the notion that it is costly to switch to another ownership structure, empirical evidence has found that such switches are rare. Mayers and Smith (1986) find only 30 stock life insurers mutualized from 1847 to 1932. Mayers and Smith (2002) identify 98 P&L insurers that converted to a stock charter from a mutual or reciprocal form of organization over 1920–1990. There is evidence that demutualization activities have increased in recent years, but they are still infrequent events. Jeng, Lai, and McNamara (2007) find 51 P&L conversions from 1981 to 1999 and 21 life–health conversions from 1988 to 1999.

distinction between the two. We will employ a strict definition of agency costs due to the separation of ownership and control, which we measure with the proportion of equity owned by managers.[3] In the spirit of the MDH, we define agency costs of managerial discretion as latitude in action that an agent is authorized to exercise, measured with the percent of business in long-tailed lines.[4] This allows us to view managerial discretion as an incremental cost that adds to agency conflicts or, alternatively, a "lever" that works to exacerbate or mitigate the potential for owner–manager conflicts, even after controlling for the level of managerial ownership. To summarize, for the single ownership structure of publicly traded stock insurance companies, the MDH predicts that firms with more stringent governance controls should specialize in lines of insurance with higher levels of managerial discretion, holding managerial ownership constant.

We study board structure and incentive pay for publicly traded P&L insurers from 1994 to 2006. Consistent with the MDH, we find that firms with more stringent governance controls specialize in lines of insurance that require higher levels of managerial discretion. Consistent with the agency theory, firms with higher levels of CEO ownership are more likely to engage in lines of insurance with higher levels of managerial discretion. However, this positive relation weakens as CEO ownership increases, consistent with the entrenchment effect and risk-aversion theory. Further, these relations hold after we control for regulatory stringency, charter provisions, payout policy, and monitoring by outside blockholders.

Our research design is built upon the intuition that within a given budget cycle, firms make business decisions given their governance structure. We believe that it is reasonable to assume that when a firm makes decisions in terms of where it is going to generate revenue in a given budget cycle, it takes its governance structure as predetermined.[5] However, in the long run, feedback likely exists between business decisions and governance structure. Therefore, although our statistical inference requires only that the governance variables be predetermined, we still undertake various tests to address potential endogeneity concerns, including using the instrumental variables

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3 In their seminal work on "Agency Costs and the Theory of the Firm," Jensen and Meckling (1976) formalize the agency costs of the separation of ownership and control and define those costs as the sum of monitoring costs, bonding costs, and residual loss. Our definition of agency costs due to the separation of ownership and control is consistent with the agency cost definition in Jensen and Meckling, and our proxy for those costs is also consistent with their definition.

4 For example, see Mayers and Smith (1981, abstract): "We argue that incentive conflicts arise when discretionary action is authorized...." Also see Mayers and Smith (1988, p. 353): "... the more discretion an agent is authorized to have, the larger is the potential for that agent to operate in his own self-interest at the expense of the other parties to the contract." We use the percent of long-tail lines to proxy the agency costs of managerial discretion because those lines have higher loss volatilities (Cummins, Phillips, and Smith, 2001), higher cost of capital (Cummins and Lamm-Tennant, 1994), and larger reserve errors (Petroni and Beasley, 1996). The literature has shown that higher risk and greater variability in performance requires greater managerial discretion (Mayers and Smith, 1994; Smith and Watts, 1992).

5 In this light, our approach is similar to Smith and Watts (1992), who treat various aspects of firm characteristics as predetermined when studying the relation between corporate policy decisions and firm characteristics.

estimation and the simultaneous equation models. Our findings hold during those robustness checks.

Our article makes several important contributions to the literature. Our study is the first to directly test the MDH solely on publicly traded insurance companies to examine whether variation in governance controls is associated with line specialization. The insurance literature has produced abundant evidence on variation in governance controls and line specialization across ownership structures in support of the MDH. However, evidence on the MDH within a single ownership structure is limited, and to the best of our knowledge, no study has tested the MDH using only publicly traded insurers.[6]

Our article is the first to find evidence of the incremental impact of corporate governance on managerial discretion, after controlling for the extent of separation of ownership and control. Agency costs of managerial discretion has been generally treated as agency costs due to separation of ownership and control, because it is difficult to empirically measure managerial discretion. Exploring the unique nature of insurance data, we are able to employ a direct measure of managerial discretion and find that firms with more stringent governance controls specialize in lines of insurance with a high level of managerial discretion.

Our study complements the strand of the finance literature that focuses on the role of financing policies in mitigating agency costs of managerial discretion (also known as agency costs of free cash flow). This literature is based on the pioneering work of Jensen (1986) and Stulz (1990), who argue that firms should reduce free cash flow under the discretionary control of managers so that they have fewer opportunities to undertake unprofitable investments. Ample studies have tested this theory in the context of asset distribution (e.g., Lang, Poulsen, and Stulz, 1995, and Bates, 2005, on assets sales; Allen and McConnell, 1998, on equity carve-outs; Nohel and Tarhan, 1998, on share repurchases). Our results suggest that in addition to forced cash payout, firms utilize corporate governance to mitigate agency costs of managerial discretion.

RELATED LITERATURE

The concept of managerial discretion is not new. Williamson (1964) illustrates managers' propensity to pursue perquisite consumption instead of maximizing shareholder wealth when they are authorized to take discretionary actions. Mayers and Smith (1981) develop the MDH to explain the coexistence of multiple ownership structures in the insurance industry. The MDH predicts that differences in firms' ability to manage agency conflicts across ownership structures will result in systematic cross-sectional variation in levels of managerial discretion, evidenced by specialization in lines of insurance. Since then, researchers have produced abundant evidence supporting this prediction. For example, Mayers and Smith (1988) find systematic variation in business activities for stock, mutual, Llyods, and reciprocal P&L insurance firms. Lamm-Tennant and Starks (1993) find that stock insurers bear more risk than mutuals. Since regulatory or tax effects can cause systematic variation in line

[6] A notable exception is Mayers and Smith (1994), who test the MDH within the single ownership structure of stock companies, but they do so across widely held, closely held, mutual-owned, and association-owned stock companies.

specialization across ownership structures, Mayers and Smith (1994) employ detailed ownership data within the population of stock insurers to test the MDH. They distinguish among widely held, closely held, mutual-owned, and association-owned stock companies and find systematic variation in line specialization across stock firms of different ownership classes. Cummins, Weiss, and Zi (1999) find that the stock frontier dominates the mutual frontier for producing stock outputs, while the mutual frontier dominates the stock frontier for producing mutual outputs. Pottier and Sommer (1997) find that, compared to stock insurers, mutuals are more prevalent in lines that require low levels of managerial discretion and are more likely to be licensed in states with more stringent regulatory requirements.

Researchers also study variation in governance controls across alternative ownership structures. The overall weight of the evidence is consistent with the predictions of the MDH. The MDH predicts that since stock insurers have a broader set of governance tools to control agency conflicts, stock insurers will have a comparative advantage in mitigating agency conflicts of managerial discretion. For example, examining executive pay contracts, Mayers and Smith (1992) find that stock insurers employ higher pay levels and more incentive pay than mutuals, consistent with the notion that stock executives exercise more discretion than mutual executives. The MDH also predicts that mutual insurers will utilize their limited set of governance tools more extensively than stock insurers to control agency conflicts of managerial discretion. Examining board structure, Mayers, Shivdasani, and Smith (1997) find that mutuals employ more outside directors than stock insurers, supporting the substitution argument that mutuals rely on board monitoring to offset the absence of control mechanisms such as stock-based pay and the takeover market. Examining corporate charter and bylaw provisions, Mayers and Smith (2005) find mutuals are more likely to include restrictive provisions than stock insurers. Lastly, Mayers and Smith (2010) find a stronger complementary relation between board independence and pay-for-performance sensitivity in mutuals than in stock companies.

HYPOTHESIS DEVELOPMENT

Mayers and Smith (1981) develop the MDH to explain the coexistence of multiple ownership structures in the insurance industry. Alternative ownership structures offer different sets of governance controls, which vary in their ability to mitigate agency conflicts. Mayers and Smith argue that firms should specialize in lines of insurance where their ownership structure provides the greatest comparative advantage in controlling agency conflicts. Therefore, the MDH predicts systematic variation in lines of insurance across ownership structures.

We focus on the predictions of the MDH for publicly traded insurance companies and argue that the level of agency conflicts is not homogenous within them. Specifically, publicly traded insurers operate in diverse lines of business, which can vary significantly in the level of managerial discretion required for pricing, underwriting, claim settlement, and setting loss reserve policy. Therefore, firms should have the same economic incentives within an ownership structure as they do across ownership structures to specialize in the lines of insurance where their governance controls provide a comparative advantage, hence, implying our first hypothesis (H1):

H1: Within an ownership structure, systematic cross-sectional variations exist between line specialization and corporate governance controls.

The alternative hypothesis is, of course, that no such systematic relation exists. This occurs if agency costs do not vary sufficiently by business lines within a given ownership structure. The alternative hypothesis also holds if different governance controls within an ownership structure do not generate sufficient comparative advantages in mitigating agency costs. In other words, if a firm's governance system does not create sufficient economic incentives for it to specialize in specific lines of insurance, no systematic relation should exist between governance controls and the level of managerial discretion. Another potential cause for the alternative hypothesis to hold is the impact of regulation. If insurance regulators act as effective surrogate monitors, rendering governance controls as nonbinding constraints, then again no systematic relations will be detected between line specialization and governance controls.

Mayers and Smith (1981) argue that agency conflicts arise whenever discretionary action is authorized. Mayers and Smith (1988, p. 353) further posit that "the more discretion an agent is authorized to have, the larger is the potential for that agent to operate in his own self-interest at the expense of the other parties to the contract." Taken together, the MDH predicts that firms with stronger governance controls will specialize in lines of insurance that require higher levels of managerial discretion, henceforth our second hypothesis (H2).

H2: Firms with more restrictive governance controls will specialize in lines of insurance with higher levels of managerial discretion.

Publicly traded insurers have a wide range of governance tools available to them. We choose to focus on board structure and executive pay to test our hypotheses because of their theoretical and practical importance as governance controls. The board of directors is the apex of the governance system of modern corporations (Fama and Jensen, 1983). They are the only governance branch that has the statutory power to both monitor the managers and oversee the business. The compensation contract provides the most direct mechanism to align executives' interests with those of shareholders (Jensen and Murphy, 1990). In addition, board structure and executive pay are dynamic governance tools, which firms can adjust more frequently than others such as charter provisions or capital structure.[7]

[7] For example, from 1994 to 2006, 61 percent, 74 percent, and 13 percent of our sample firm years exhibit a change in board structure, incentive pay, and the *G-index*, respectively. (Board structure is measured as the fraction of outsiders on the board, board size and board leadership. Incentive pay is pay-for-performance sensitivity from the CEO's option portfolio. *G-index* is an index of governance provisions that IRRC provides for major US firms.) Additionally, Lemmon, Roberts, and Zender (2008) find that capital structure is very stable. High- (low-) levered firms remain as such for over two decades. Further, this pattern is robust to firm exit, is present prior to the IPO, and is largely unaffected by the process of going public.

Board structure has three broad dimensions: board composition, board size, and board leadership. Agency theory predicts that independent directors are more effective monitors than directors who are insiders (e.g., members of the management team) or affiliated with the firm (e.g., suppliers or service providers), because they face fewer incentive conflicts (Fama and Jensen, 1983). However, independent directors, being outsiders to the firm, lack firm-specific knowledge and, thus, face higher information acquisition and assimilation costs. Consistent with this information cost argument, Linck, Netter, and Yang (2008) find that firms with high stock price volatility have less independent boards. Lines of insurance that require greater managerial discretion likely have higher information asymmetry. Studies find that long-tailed lines have greater loss volatility and reserve errors (Cummins, Phillips, and Smith, 2001; Petroni and Beasley, 1996). However, firms with greater managerial discretion also face more significant agency conflicts (Mayers and Smith, 1981, 1988). Assuming that firms are value maximizers, we expect firms to undertake costly monitoring as long as the benefits of monitoring outweigh the costs (Jensen and Meckling, 1976). Organization theory predicts that smaller groups incur lower communication and coordination costs and fewer free-rider problems in decision making than larger groups (Jensen, 1993). Therefore, given that we assume board structure is predetermined and absent of other confounding effects, the MDH predicts that firms with smaller and more independent boards should realize greater competitive advantages when specializing in lines of insurance with high levels of managerial discretion.

Holmstrom (1979) argues that when information asymmetry is high, incentive pay is more cost effective to induce managers to take value-maximizing actions. Smith and Watts (1992) make similar arguments that firms should use more incentive pay when marginal impact of managerial discretion is large. Therefore, absent of other confounding effects, the MDH predicts a positive relation between incentive pay and the level of managerial discretion.

In practice, corporate governance is a system of interdependent controls, which may serve as complements or substitutes to each other. Williamson (1983, 1988) argues that varying contractual relations have comparative governing competencies and costs, suggesting a substitution effect among incentive controls. In addition, Mayers and Smith (2010) argue that when incentive controls are numerous, the interdependent nature of these controls make the relation between any two uncertain. Therefore, although the MDH poses unambiguous predictions regarding the aggregate effect of governance controls on managerial discretion, the individual effect of any single governance control is less clear. Hence, we focus on the joint effect of governance controls to test our hypotheses.

SAMPLE DESCRIPTION

Sample Construction

We start the sample collection process with all publicly traded P&L insurers that file with the National Association of Insurance Commissioners (NAIC) and have CEO compensation data in ExecuComp. ExecuComp contains detailed compensation data for the top five executives at firms in the S&P 500, S&P Midcap 400, and S&P

SmallCap 600 indices. We obtain net premium written and *Total admitted assets* from NAIC.[8] We collect CEO pay data from ExecuComp. We collect data on board size and the percent of independent directors on the board from RiskMetric (formerly known as IRRC). When such information is missing, we manually collect data from corporate proxy statements, which are available online through SEC Edgar (49 such cases). We manually collect data used to code independent chairman of the board (*Indep_chair*) from proxy statements. (RiskMetric only has sufficient information for us to code whether the chairman of the board is the CEO, instead of whether the chairman is an independent director.) Data on CEO age and tenure along with all ownership data are also manually collected from proxy statements except for institutional ownership, which comes from Thomson Financial.[9] We obtain the *G-index* from the IRRC Governance database (which is also known as the IRRC Takeover Defense database and is accessible through WRDS). This IRRC database provides information on takeover defense and other corporate governance provisions for major U.S. firms. Data used to compute the market-to-book ratio (*MTB*), return on assets (*ROA*), and the payout ratio (the sum of common and preferred stock dividends plus repurchases over earnings before interest and taxes, *payout ratio*) come from Compustat. Stock return data come from CRSP. We collect firm age, which is defined as years since inception, from various sources, including proxy statements, corporate websites, Yahoo! Finance, etc. We obtain insurance regulatory data from the 1997 Report of State Market Analysis for Property-Casualty Insurance, published by Coning & Co. The final sample consists of 526 firm-years from 1994 to 2006 or 72 unique firms.[10] Ten firms have data for all 13 years. The median firm provides seven firm-year observations over our 13-year sample period.

Sample Description

Table 1 describes the operating, governance and ownership characteristics for the sample. Percent of total net premium written in long-tailed lines is 53 percent. Mean and median total assets are $11,432 and $3,893 (in millions). Those numbers are similar to those (50 percent, 9,730 and 3,434, respectively) reported in Eckles et al. (2011), whose sample is also based upon ExecuComp firms. The average firm age is 66, which is considerably older than that of a typical industrial firm. Linck et al. (2008) report eleven for the average firm in the CRSP database.

[8] NAIC data can be reported at both the group and company levels. Some insurance groups provide consolidated statutory statements for their groups to the NAIC, while, for others, each firm within an insurance group reports financial data to the NAIC. Therefore, we create consolidated data for each insurance group. Our resulting aggregated insurance group data are consistent with those insurers who report consolidated financial information to the NAIC.

[9] For 10 observations, we have RiskMetric and ExecuComp data but cannot find proxy statements. In those cases, we use CEO ownership reported in ExecuComp.

[10] Financial data and CEO pay data are reported at fiscal year-end. The rest of the data, including board data, the *G-index* and stock price data, are reported on a calendar-year basis. We merge all data using calendar year after converting fiscal-year data to calendar-year data following the convention used by WRDS; that is, fiscal years ending between January and May are assigned to the previous calendar year while fiscal years ending between June and December are assigned to the current calendar year.

TABLE 1
Sample Description

	n	Mean	Median	Std. Dev.	1st Quartile	3rd Quartile
Firm characteristics						
%long tail	526	53.02%	59.93%	29.56%	39.60%	71.02%
FTE	526	3.95	4.44	1.03	3.32	4.64
Total admitted assets (in $ millions)	526	$11,432	$3,893	$19,541	$1,112	$10,397
Market value of equity (in $ millions)	521	$22,820	$4,281	$62,781	$1,473	$11,593
Firm age	506	66.20	54.00	49.28	26.00	96.00
MTB	515	1.24	1.11	0.58	1.03	1.24
Stock return	515	16.67%	14.40%	35.53%	−3.42%	34.92%
ROA	463	5.96%	4.49%	7.16%	2.51%	7.38%
Debt ratio	521	8.51%	5.52%	9.90%	2.71%	10.24%
Payout ratio	454	16.26%	17.62%	253.78%	7.58%	36.22%
CEO age	506	57.70	56.50	8.37	52.00	62.00
CEO tenure	506	11.42	7.00	11.12	3.00	18.00
Governance characteristics						
Board size	506	11.18	11.00	2.98	9.00	13.00
%independent directors on the board	506	63.98%	66.67%	18.88%	53.85%	80.00%
%firms with independent chairman	506	6.72%	0.00%	25.06%	0.00%	0.00%
%firms with CEO as chairman	506	74.31%	100.00%	43.74%	0.00%	100.00%
Incentive (in $)	509	7.11	4.07	8.75	1.50	9.22
G-index	521	8.47	8.00	2.63	7.00	10.00
Ownership structure						
%CEO ownership	506	6.28%	0.90%	13.04%	0.27%	5.50%
%D&O ownership	496	11.36%	4.67%	15.59%	1.51%	13.78%
%ownership by outside blockholders	496	12.74%	10.85%	12.05%	0.00%	19.55%
%institutional ownership	480	63.07%	64.73%	19.99%	49.56%	78.23%

Notes: This table summarizes firm characteristics for our sample of 72 unique firms from 1994 to 2006. The number of observations (*n*) varies across variables due to data availability. *%long tail* is the percent of total net premium written in long-tailed lines of insurance. We obtain net premium written and *Total admitted assets* from NAIC. *FTE* is the number of full-time employees in the Insurance Department over total number of domestic and foreign insurers of all types in a state. We obtain the FTE ratio from the 1997 Report of State Market Analysis for Property-Casualty Insurance, published by Coning & Co. *Firm age* is the number of years since firm's formation. We obtain firm age from various sources, including proxy statements, corporate websites, Yahoo! Finance, etc. *MTB* is the market-to-book ratio. *ROA* is net income over total book assets. *Debt ratio* is long-term debt over total assets. *Payout ratio* is the sum of common and preferred stock dividends plus repurchases over earnings before interest and taxes. Data used for calculating *Market value of equity, MTB, ROA,* and *payout ratio* come from Compustat and CRSP. *Board size* is the total number of directors on the board. *%D&O ownership* is director and officer ownership. We collect board data from RiskMetric (formerly IRRC). We collect ownership data from proxy statements except for *%institutional ownership,* which comes from Thomson Financial. *Incentive* is the pay-for-performance sensitivity that measures the change in the CEO option portfolio per $1,000 increase in shareholder wealth. CEO pay data come from ExecuComp. *G-index* is the Gompers, Ishii, and Metrick index, which is the sum of 24 governance provisions. We obtain the *G-index* from RiskMetric.

Incentive is the pay-for-performance sensitivity that measures the change in the CEO option portfolio, including current and previously granted options, per $1,000 increase in shareholder wealth.[11] We focus on option pay to proxy for the incentive that a firm provides to the CEO through the compensation package, because Jensen and Murphy (1990) demonstrate that the majority of incentives come from stock and option holdings. Further, Hall and Murphy (2003) find that since the study of Jensen and Murphy, option pay has grown dramatically. (In multivariate analysis, we will use CEO ownership and CEO ownership squared to control for the effects of incentive alignment and entrenchment due to stock holdings.) Mean and median values of *incentive* for our sample firms are $7.11 and $4.07, respectively. These numbers are in line with the existing literature. For example, Aggarwal and Samwick (2003) report that mean and median changes in the CEO option portfolio per $1,000 increase in shareholder wealth are 8.6 and 4.35 for all ExecuComp firms from 1993 to 1997.

The median *G-index* is eight, compared to nine for the rest of the firms in the IRRC Governance database (p-value for the t-test is 0.009).[12] The characteristics of long firm history and fewer antitakeover provisions, when compared to industrial firms, are indicative of the unique nature of the insurance industry. Regulation plays a pivotal role in the insurance industry. Insurance companies are under tight regulatory scrutiny to promote solvency. Active regulatory intervention can reduce the role of the takeover market, resulting in fewer antitakeover provisions. This result underlines the importance of controlling for any potential regulatory effects in our analysis. Figures for mean and median CEO ownership are 6.28 percent and 0.90 percent, respectively. The highly skewed distribution results from the presence of founder firms. Seventeen of the 72 sample firms are founder firms (25 percent of the firm-year observations). We define a firm as founder firm, if the current CEO, chairman of the board, or their ancestors helped found the company.[13]

The average CEO ownership in founder firms is 19 percent, compared to just 1.8 percent for nonfounder firms. In Table 2, we compare other characteristics between founder and nonfounder firms. There are 526 firm-years from 1994 to 2006. The number of observations varies across variables due to data availability. As Table 2 shows, founder firms differ significantly from nonfounder firms in terms of operating and governance characteristics. Founder firms are more likely to engage in long-tailed lines and to have older and longer tenured CEOs, smaller and less independent boards, and fewer antitakeover provisions. All these differences are statistically

[11] We use the 1-year approximation (OA) method of Core and Guay (1999, 2002) to calculate the value and sensitivity of the CEO's option portfolio. Our definition of pay-for-performance sensitivity is consistent with the literature (e.g., Jensen and Murphy, 1990; Yermack, 1995). Please see the Appendix for details on the definition and construction of this variable.

[12] *G-index* is the sum of 24 governance provisions including poison pills, classified boards, golden parachutes, etc. Gompers, Ishii, and Metrick (2003) create this governance index to proxy for the power balance between the manager and shareholders.

[13] This definition is in line with the one used in Mayers, Shivdasani, and Smith (1997). They define a firm as founder firm if "the current CEO, president, or chairman of the board helped organize the company."

TABLE 2
Founder Firms Versus Nonfounder Firms

	Founder Firms			Nonfounder Firms			
	n	Mean	Median	*n*	Mean	Median	Difference
%long tail	129	60.53%	64.08%	378	50.43%	56.85%	10.10%***
Total admitted assets (in millions)	129	$13,752	$2,247	378	$11,029	$4,456	$2,723
Firm age	129	49.28	39.00	378	71.97	69.00	−22.69***
CEO age	129	60.76	59.00	377	56.65	56.00	4.11***
CEO tenure	129	19.95	20.00	377	8.50	6.00	11.45***
Board size	129	9.65	9.00	377	11.70	12.00	−2.05***
%independent directors on the board	129	46.16%	44.44%	377	70.08%	71.43%	−23.92%***
%firms with independent chairman	129	0.00%	0.00%	377	9.02%	0.00%	−9.02%[a]
%firms with CEO as chairman	129	78.29%	100.00%	377	72.94%	100.00%	5.35%[b]
Incentive	128	9.44	3.53	373	6.32	4.12	3.12***
G-index	129	7.29	7.00	378	8.88	9.00	−1.59***
%CEO ownership	129	19.35%	9.87%	377	1.80%	0.57%	17.55%***

Notes: The table compares firm characteristics of founder firms with those of nonfounder firms. We define a firm as founder firm if the current CEO, chairman of the board, or their ancestors helped found the company. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, based on *t*-test assuming unequal variance. The letters [a], [b], and [c] denote significance at the 1%, 5%, and 10% levels, respectively, based on chi-square test. The number of observations (*n*) varies across variables due to data availability.

significant at 1 percent level. Thus, we will control for the effect of founder firms in our regression analysis.[14]

RESEARCH DESIGN

Model Specification and Variable Definition

We use the following model specification to test H1 and H2:

$$\begin{aligned}\log(\%long - tail_{i,t}) = \alpha &+ \gamma\, Gov\_controls_{i,t-1} + \beta_1 CEO\_Own_{i,t-1} \\ &+ \beta_2 CEO\_Own_{i,t-1}{}^{\wedge}2 + \beta_3\, CEO\_Own_{i,t-1} * Founder_i \\ &+ \beta_4 (CEO\_Own_{i,t-1}{}^{\wedge}2) * Founder_i + \beta_5\, Founder_i + \beta_6\, Firm\_size_{i,t} \\ &+ \beta_7\, FTE + \beta_8\, Surety + \beta_9\, Group + Year\_dummies. \qquad (1)\end{aligned}$$

Table 3, Panel A summarizes variable definitions and predicted signs for the key variables. The dependent variable (log(*%long-tail*)) is the log of the percent of total

[14] We document the differences between founder and nonfounder firms to motivate our research design. We do not investigate the causes of those differences, because such investigation is beyond the scope of this article.

TABLE 3
Variable Definitions

Panel A: Definition of Key Variables and Their Expected Relations With the Level of Managerial Discretion

Variables	Predicted Signs	Variable Definition
Gov_control	+ (jointly)	Shorthand for the four governance control variables that collectively measure the strength of corporate governance system: *%outsider*, *b_size*, *indep_chair*, and *incentive*. • *%outsider*: Percentage of independent directors on the board • *b_size*: Negative one multiplied by the log of the number of directors on the board • *Indep_chair*: A categorical variable that takes the value of zero if the CEO is the chairman of the board, two if an independent director is the chairman of the board, and one otherwise • *Incentive*: The log of the pay-for-performance sensitivity that measures the change in the CEO option portfolio, including current and previously granted options, per $1,000 increase in shareholder wealth (see the Appendix for details of the construction of this variable)
CEO_Own	+	Percent of equity ownership by the CEO
CEO_Own^2	−	Squared term of *CEO_Own*

Panel B: Definition of Other Variables, in Alphabetical Order

Variables	Variable Definition
%long tail	Percent of net premium written in long-tailed lines of insurance. Long-tailed lines includes accident, health and disability lines such as workers' compensation and lines of insurance that provide primarily liability coverage, such as automobile liability, general liability, and medical malpractice. Short-tail lines are composed of the other lines (e.g., fire, homeowners' peril, and automobile physical damage)
CEO_tenure	Log of the number of years that a CEO has been in the current post
Debt ratio	Long-term debt over total assets
D&O_Own	Equity ownership by directors and officers
Founder	Indicator variable for whether it is a founder firm
Firm_age	Log of the number of years since inception
Firm_size	Log of total admitted assets
FTE	Full-time equivalency ratio (FTE), which is the total number of full-time employees in the insurance department over the total number of domestic and foreign insurers of all types in a state
G-index	Log of the Gompers, Ishii, and Metrick (2003) *G-index*
MTB	Log of the market-to-book equity ratio
MVE	Market value of equity
Payout ratio	The sum of common and preferred stock dividends plus repurchases over earnings before interest and taxes
RET	Annual stock return
RET_volability	Annualized standard deviation of 12-month stock returns
ROA	Net income over total book assets
SOX	Indicator variable for 2002, when the Sarbanes–Oxley Act (SOX) is enacted
Surety	Indicator variable for whether it is a surety firm

Notes: Panel A defines the key variables and provides the shorthand and predicted signs for these variables in the regressions. Panel B defines other variables used in the regressions and the corresponding shorthand.

net premium written in long-tailed lines of insurance. We use *%long-tail* to proxy for the level of managerial discretion required in lines of insurance because the existing literature establishes that long-tailed lines allow the management more discretion than short-tailed lines (see, e.g., Mayers and Smith, 1994; Beaver, McNichols, and Nelson, 2000). *Gov_controls* stands for the four governance variables that we use to proxy for the strength of a firm's corporate governance system: (1) the percent of independent directors on the board (*%outsider*); (2) negative one multiplied by the log of the number of directors on the board (*b_size*)—we multiply board size by negative one so that, like the rest of the governance variables, a higher *b_size* indicates more stringent monitoring; (3) a categorical variable that takes the value of zero if the CEO is the chairman of the board, two if an independent director is the chairman, and one otherwise (*Indep_chair*); and (4) the log of the pay-for-performance sensitivity (*Incentive*). We lag governance and ownership variables to mitigate endogeneity concerns, which we will discuss in more detail in the "Endogeneity, Instrumental Variables, and Simultaneous Equations" section. Based on our hypotheses, we expect these four governance variables are jointly and positively related to log(*%long-tail*). Specifically, H1 predicts $\gamma \neq 0$, and H2 predicts $\gamma > 0$.

We include CEO ownership (*CEO_own*) to control for the incentive alignment effect and squared CEO ownership (*CEO_own* ^2) to capture the effects of managerial entrenchment and risk aversion. According to agency theory, managers' incentives are more aligned with those of shareholders when managers own equity in the firm. Therefore, firms with higher levels of CEO ownership should realize greater savings in contracting costs when specializing in lines that require higher levels of managerial discretion than firms with lower levels of CEO ownership. However, as managerial ownership rises, CEOs face increased firm-specific risk in terms of both personal wealth and human capital. As CEOs are unable to hedge firm-specific risk perfectly, firms with high levels of CEO ownership face increased costs in writing long-tailed business due to CEO risk aversion. Entrenchment theory predicts that, as the level of managerial ownership increases, managers gain sufficient influence to insulate themselves from monitoring by the corporate governance system. Thus, the entrenchment and risk aversion theories suggest that the reduction of agency costs from the increase of managerial ownership will not only diminish in magnitude but may also reverse in sign.

As we discussed earlier, founder firms consist of a sizable portion of our sample. Thus, we include a *Founder* dummy to control for the possibility that those firms behave differently than others. Following the same logic, we also interact *Founder* with *CEO_Own* and *CEO_Own*^2. We include the log of total admitted assets (*Firm_size*) to control for the economies of scale and scope. Mayers and Smith (1994) and Pottier and Sommer (1997) argue that firm size determines economies of scale and scope, which impact business activities. To proxy for regulatory stringency, we include *FTE*, the total number of full-time equivalent employees in a state's insurance department over the total number of domestic and foreign insurers of all types in the state.[15] We have eight firms that write zero long-tailed lines for all sample years. All are surety

[15] We obtain similar results if we replace FTE with the External Climate Index (ECI). Our governance variables come in with the same sign and significance. ECI generally has the same sign and significance level as FTE, except that ECI is more significantly, positively related

firms. Hence, we also include an indicator variable for surety firms to control for the potential that they are systematically different from other insurance firms. We include an indicator variable for whether an insurer belongs to a group (*Group*) to control for any unobserved group effects. Lastly, we include year dummies to control for any potential time effects. Our sample period spans 1994 to 2006. Some significant events occurred during this period, which could substantially impact board structure and incentive pay, including the Sarbanes–Oxley Act of 2002.

Estimation Method

We choose random-effects panel data analysis as our primary estimation method. Panel data analysis is popular for analyzing longitudinal data because it allows researchers to garner richer and more accurate information. Two primary methods are available for panel data analysis—the fixed-effects model (FE) and the random-effects model (RE). FE permits correlation between unobserved heterogeneity and explanatory variables and, thus, is preferred to RE when latent factors exist in cross-section or time series. For example, firm heterogeneity such as corporate culture and managerial ability or temporal heterogeneity such as technology advancement and law changes can correlate with changes in governance characteristics, making RE estimation inconsistent. However, the robustness of FE comes at a cost. By creating dummies to model unobserved heterogeneity, FE can suffer from multicollinearity or inadequate statistical power. Further, using group dummies precludes estimating any variable that does not vary within the group.

RE is appropriate for our data for the following reasons. First, when we use both RE and FE models to estimate Equation (1), the Hausman test fails to reject that there is any systematic difference between the coefficient estimates obtained from the two models (p-value = 0.664). Applied researchers have chosen RE over FE in this situation (Cornwell and Rupert, 1997). Second, many of our variables, including one of the governance variables, lack substantial variation over time.[16] In those cases, FE leads to imprecise estimation due to large standard errors (Wooldrige, 2002). But, we do estimate FE models as a robustness check and report the results when appropriate.

REGRESSION RESULTS

The Impact of Board Structure and Compensation Contract on Managerial Discretion

Column I of Table 4 reports regression results from estimating Equation (1) using the RE model. *%long-tail* is negatively and significantly related to board independence (*%outside*) and is positively and significantly related to board size (*b_size*). Coefficients of the dummy for independent chairman (*Indep_chair*) and incentive pay (*Incentive*) are insignificant. To test H1, we perform Wald test to evaluate the joint significance of the four governance variables. The p-value of the Wald test is 0.016, rejecting

to log(*%long-tail*) in the random-effect estimation of Equation (1) and in the simultaneous equation estimation.

[16] For example, only 28 of our 72 firms exhibit any change in the status of board leadership (*Indep_chair*) over the sample period. This is not surprising given that the typical firm in our sample has 7 years of data, while CEO tenure averages 11 years. Further, firms frequently award the CEO the chairman title. Thus, even when a CEO is replaced, the status of *Indep_chair* may not change due to this dual-title practice.

TABLE 4
Regression Results for Equation (1): The Impact of Board Structure and CEO Compensation on Managerial Discretion, Controlling for CEO Ownership

	Dependent Variable: log(%*long tail*)				
	I RE	II FE	III RE, With Robust Std. Error	IV RE, Without Surety Firms	V Tobit With RE
(1) $\%outsider_{t-1}$	−0.039*	−0.035*	−0.039*	−0.047*	−0.039*
	(0.066)	(0.104)	(0.063)	(0.059)	(0.059)
(2) b_size_{t-1}	0.050***	0.043***	0.050***	0.059***	0.050***
	(0.003)	(0.013)	(0.001)	(0.004)	(0.002)
(3) $Indep\_chair_{t-1}$	−0.003	−0.003	−0.003	−0.003	−0.003
	(0.615)	(0.567)	(0.518)	(0.621)	(0.604)
(4) $Incentive_{t-1}$	0.005	0.006	0.005	0.005	0.005
	(0.235)	(0.163)	(0.289)	(0.213)	(0.221)
(5) CEO_Own_{t-1}	0.016***	0.014***	0.016***	0.018***	0.016***
	(0.003)	(0.009)	(0.003)	(0.002)	(0.002)
(6) CEO_Own_{t-1}^2	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***
	(0.003)	(0.008)	(0.007)	(0.002)	(0.002)
(7) $CEO\_Own_{t-1} * Founder$	−0.020***	−0.018***	−0.020***	−0.022***	−0.020***
	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)
(8) $(CEO\_Own_{t-1}^{2}) * Founder$	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.001)	(0.004)	(0.004)	(0.001)	(0.001)
Founder	0.054		0.054	0.052	0.054
	(0.234)	(0.000)	(0.189)	(0.324)	(0.224)
Firm_size	0.011***	0.011***	0.011	0.011***	0.011***
	(0.000)	(0.001)	(0.157)	(0.000)	(0.000)
FTE	0.003	0.004	0.003	0.003	0.003
	(0.574)	(0.384)	(0.584)	(0.612)	(0.561)
Surety	−0.474***		−0.474***		−0.474***
	(0.000)		(0.000)		(0.000)
Sum of beta coeff. of (1), (2), (3), and (4)	0.046	0.043	0.046	0.052	0.046
Wald test for joint significance					
p-value for (1), (2), (3), and (4)	(0.016)**	(0.046)**	(0.014)***	(0.015)**	(0.012)***
p-value for (5) and (6)	(0.010)***	(0.030)**	(0.007)***	(0.002)***	(0.008)***
p-value for (5), (6), (7), and (8)	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Wald chi-square value	146.97	$F(22, 351) = 3.70$	423.98	78.83	155.22
No. of obs.	440	440	440	384	440
R^2	0.538	0.000	0.538	0.027	N/A

Notes: This table reports regression results for an unbalanced panel of 72 firms over 13 years. Model I uses the random-effects (RE) model. Model II uses the fixed-effects (FE) model. Model III uses the RE model with robust standard errors. Model IV uses the RE model, excluding surety firms. Model V estimates the RE Tobit model. Variables are as defined in Table 3. All models include a constant, year dummies, and a dummy for whether a firm belongs to a group. Coefficient estimates on these variables are not reported to conserve space. The p-values are reported in parentheses below the coefficient estimates. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

the null that the coefficients of *%outside, b_size, Indep_chair*, and *Incentive* are jointly insignificant. Therefore, our results support H1.

H2 predicts that the joint effect is positive. Given that the four governance variables are measured in different units, we cannot simply add together their coefficients to assess the directional impact of their aggregate effect. Therefore, we calculate beta coefficients, which allow us to interpret the effect of the governance variables in the common unit of standard deviation.[17] The sum of the beta coefficients of the four governance variables is 0.046, suggesting that one standard deviation increase in those variables increases log(*%long-tail*) by 0.046. Therefore, our results support H2; namely, firms with more stringent governance controls specialize in lines of insurance that require higher levels of managerial discretion.

Percent of long-tailed lines is positively related to CEO ownership but is negatively related to CEO ownership squared. Both relations are significant at 1 percent level. These findings are consistent with agency theory. As a CEO owns more equity in the firm, his or her incentives become more aligned with those of shareholders. Consequently, contracting costs decrease and the firm develops a comparative advantage in specializing in business lines with high levels of managerial discretion. However, as CEO ownership continues to increase, the firm's contracting advantage diminishes, because the CEO becomes entrenched and/or more risk averse. Our data suggest that not only does the contracting advantage diminish as CEO ownership increases, but it also reverses in sign. Within our sample, this inflection point occurs at the ownership level of 7.51 percent.[18] This point is higher than both the mean (6.28 percent) and the third quartile (5.5 percent). Therefore, most firms in our sample are likely to be below their own inflection points.

The coefficient of *CEO_Own* $*$ *Founder* is negative and significant, while that of *CEO_Own^2* $*$ *Founder* is positive and significant, suggesting a U-shaped relation between the percent of long-tailed lines and CEO ownership. The inflection point occurs at 27 percent. This result, together with the coefficients of *CEO_Own* and *CEO_Own^2*, reinforces the notion that agency conflicts differ for founder firms.[19]

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[17] To calculate beta coefficient, we multiply the regression coefficients from the RE estimation by the standard deviation of the respective governance variable over the standard deviation of the dependant variable (log(*%long-tail*)), specifically, $\beta_i^{beta} = \hat{\beta}_i^{RE}(s_i/s_y)$, where s stands for standard deviation, i denotes the four governance variables, and y denotes the dependent variable.

[18] The inflection point is where the second derivative of CEO ownership with respective to percent of long-tail lines is zero, alternatively, where $\beta_1 + 2\beta_2 CEO\_Own = 0$. Hence, $-\frac{\beta_1}{2\beta_2} = -\frac{0.016}{2*(-0.001)} = 7.51$ percent.

[19] Anderson, Duru, and Reeb (2009) find that founder firms are more opaque than nonfounder firms and use opacity to expropriate minority shareholders. DeAngelo and DeAngelo (2000) Buchanan and Yang (2005) find that founder firms suffer from me-syndrome, that is, viewing the firm belonging to the family instead of to shareholders, and extract rents through dividends, empire building, and related-party transactions. Villalonga and Amit (2006) and Anderson and Reeb (2003) also find that founder firms suffer from nepotism (e.g., award executive positions to family members instead of to more capable outsiders).

We find that large firms are more likely to engage in lines of business that require high levels of managerial discretion, supporting the argument of economies of scale and scope. Long-tailed lines involve greater uncertainty and require greater operational expertise. Large firms with greater resources and more established organizational structure are better equipped than small firms to meet those challenges. The dummy variable for surety firms is negative and significant, which is not surprising given that all the surety firms in our sample write zero long-tailed insurance.

As we discussed earlier, the RE model is our preferred estimation method. But we also estimate the FE model for robustness. Their results are reported in column II of Table 4. We test our data for heteroskedasticity. The Breusch–Pagan test fails to reject the homoskedasticity assumption (p-value = 0.880). Nonetheless, we run the RE model using robust standard errors for robustness check and report the results in column III. In case surety firms are not representative of our sample, we estimate Equation (1) excluding surety firms. Results are reported in column IV. Considering that our dependent variable is bounded by zero and one, we also estimate Equation (1) using the Tobit model. We report the results in column V. As Table 4 shows, our results hold regardless of the specification.

The Impact of Other Governance Controls

Corporate governance is a system of interrelated controls. In this section, we test whether the effects of board structure and executive compensation hold when we control for other governance mechanisms. We focus on charter provisions, outside blockholders, and the payout ratio.[20] Charter provisions reflect the power balance between the manager and the shareholders. Gompers, Ishii, and Metrick (2003) construct the *G-index* to proxy for this power balance. Since most of the provisions in the *G-index* are antitakeover defenses, Gompers, Ishii, and Metrick argue that firms with high *G-index* are likely to have entrenched managers and face high agency costs. Consistent with this argument, Gompers, Ishii, and Metrick find that firms with high *G-index* perform poorly. However, counterarguments also exist that antitakeover provisions protect shareholder value, because they enable the mangers to focus on the long-term strategies and survival of the firm. Particularly relevant for our study, Giammarino, Heinkel, and Hollifield (1997) build a model where antitakeover provisions can mitigate agency problems of free cash flow.

Shleifer and Vishny (1986, 1997) argue that large blockholders have the economic incentive to actively monitor the managers. Jensen (1986) highlights the importance of dividend payout in curbing the agency costs of free cash flow. By taking excess resources away from managers, firms limit the potential of managers to invest in negative net present value (NPV) projects. Consistent with this view, Smith and Watts (1992) find that firms with more growth options have lower dividend yield.

[20] Although in the short run it is reasonable to treat certain governance characteristics like charter provisions and outside blockholder ownership as predetermined in statistical tests like ours, in the long run all aspects of firm characteristics are endogenously determined. The literature currently lacks a structural model to allow definitive estimation of causal relations among firm characteristics. We believe that more in-depth analysis of cross-sectional data like ours helps produce such structural models.

Fenn and Liang (2001) also find high payout ratios for firms with low managerial ownership and few investment opportunities.

Table 5 reports estimation results of Equation (1), controlling for charter provisions, outside blockholder ownership, and the payout ratio. As Table 5 shows, our results remain unchanged when controlling for these additional incentive controls. In all cases, *%outside, b_size, Indep_chair*, and *Incentive* are jointly and positively significant. In addition, outside blockholder ownership is positively and significantly related to the level of managerial discretion, consistent with the notion that outside blockholders play an important monitoring role. We find some evidence that firms with high payout engage in low discretionary lines.[21]

Endogeneity, Instrumental Variables, and Simultaneous Equations

The objective of this study is to test the MDH within publicly traded insurance companies. Therefore, we assume that a firm's governance structure is predetermined with regard to its operational decisions. We believe that, in practice, especially in the short term, sufficient independence exists between these decisions to justify treating governance decisions as predetermined to revenue growth strategy (i.e., which lines of business the firm plans to generate revenue from in a given budget cycle). However, we recognize the feedback between operational decisions and governance decisions, especially in the long term. Therefore, although our inference requires only our governance variables be predetermined, not completely exogenous, we take several steps to directly mitigate endogeneity concerns. As discussed above, we lag governance and ownership variables by 1 year to reduce the potential contemporaneous relations between these variables and the level of managerial discretion. We also use the methods of instrumental variables (IV) and simultaneous equations (SEM), whose results are discussed below.[22]

Estimation Using IV. To get valid inference from IV estimation, we need to find instruments that are correlated with our governance variables but not with the disturbance term. We choose the following as our instruments: the log of firm age, the log of CEO tenure, debt ratio, the MTB ratio, and the percent of institutional ownership.[23] The existing literature shows that these variables are important determinants

[21] As descriptive statistics show, we have extreme values for the payout ratio. To mitigate the influence of outliers, we include only those observations that have payout ratios between zero and one (about 1 percent truncation at either tail), when estimating models that include the payout ratio. We obtain similar results without such restrictions. Specifically, for model III, the p-value of the joint test of the four governance variables is 0.021 with the sum of the beta coefficients equals 0.052. For model V, the p-value of the joint test of the four governance variables is 0.030 with the sum of the beta coefficients equals 0.045. Additionally, the payout ratio is insignificant in both models when there is no truncation.

[22] We acknowledge that each of our robustness checks has limitations. For example, although IV can solve endogeneity problems, it is extremely difficult to identify a good instrument. Therefore, we perform a multitude of tests and believe that the overall weight of the evidence supports the MDH.

[23] We use the log form of firm age and CEO tenure to approximate normal distributions as neither variable has negative values and firm age has extremely large values (e.g., maximum firm age is 208).

TABLE 5
Impact of Board Structure and CEO Compensation on Managerial Discretion, Controlling for Other Governance Mechanisms

	Dependent Variable: log(%*long tail*)			
	I	II	III	IV
	RE	RE	RE	RE
(1) $\%outsider_{t-1}$	−0.040*	−0.038*	−0.041**	−0.040**
	(0.062)	(0.078)	(0.052)	(0.054)
(2) b_size_{t-1}	0.052***	0.044***	0.049***	0.042***
	(0.002)	(0.010)	(0.004)	(0.011)
(3) $Indep\_chair_{t-1}$	−0.003	−0.003	−0.006	−0.006
	(0.640)	(0.541)	(0.309)	(0.243)
(4) $Incentive_{t-1}$	0.004	0.005	0.006	0.007*
	(0.289)	(0.187)	(0.139)	(0.092)
(5) CEO_Own_{t-1}	0.016***	0.015***	0.020***	0.018***
	(0.003)	(0.005)	(0.000)	(0.001)
(6) CEO_Own_{t-1}^2	−0.001***	−0.001***	−0.001***	−0.001***
	(0.003)	(0.008)	(0.000)	(0.000)
(7) $CEO\_Own_{t-1} * Founder$	−0.020***	−0.018***	−0.024***	−0.021***
	(0.000)	(0.001)	(0.000)	(0.000)
(8) (CEO_Own_{t-1}^2) $* Founder$	0.001***	0.001***	0.001***	0.001***
	(0.001)	(0.005)	(0.000)	(0.000)
Founder	0.067	0.056	0.048	0.048
	(0.151)	(0.215)	(0.342)	(0.362)
Firm_size	0.010***	0.011***	0.008**	0.008**
	(0.001)	(0.000)	(0.046)	(0.036)
FTE	0.003	0.003	0.002	0.002
	(0.592)	(0.497)	(0.670)	(0.670)
Surety	−0.473***	−0.469***	−0.477***	−0.478***
	(0.000)	(0.000)	(0.000)	(0.000)
G_index	−0.030			−0.017
	(0.168)			(0.451)
%ownership by outside blockholders		0.001***		0.001***
		(0.006)		(0.005)
Payout ratio			−0.016	−0.020*
			(0.168)	(0.081)
Sum of beta coeff. of (1), (2), (3), and (4)	0.046	0.039	0.041	0.035
Wald test for joint significance				
p-value for (1), (2), (3), and (4)	(0.013)***	(0.032)**	(0.009)***	(0.011)***
p-value for (5) and (6)	(0.010)***	(0.020)**	(0.001)***	(0.002)***
p-value for (5), (6), (7), and (8)	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Wald chi-square value	148.87	158.35	137.60	150.45
No. of obs.	440	429	361	352

Notes: This table reports regression results from estimating RE models. Variables are as defined in Table 3. All models include a constant, year dummies, and a dummy for whether a firm belongs to a group. Coefficient estimates on these variables are not reported to conserve space. For models that include payout ratio, we restrict the sample to have a payout ratio between zero and one to avoid outliers (approximately 1% truncation at either tail). (The results retain if this restriction is lifted.) The *p*-values are reported in parentheses below the coefficient estimates. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively

TABLE 6
Estimation Results of Equation (1), Using Instrumental Variables

	IV (2SLS) Estimation				
	2nd-Stage Regression I	1st-Stage Regression			
	Log (*%long tail*)	II *%outsider*$_{t-1}$	III *b_size*$_{t-1}$	IV *Indep_chair*$_{t-1}$	V *Incentive*$_{t-1}$
(1) *%outsider*$_{t-1}$	−0.324				
	(0.140)				
(2) *b_size*$_{t-1}$	−0.069				
	(0.662)				
(3) *Indep_chair*$_{t-1}$	0.024				
	(0.478)				
(4) *Incentive*$_{t-1}$	0.176***				
	(0.004)				
(5) *CEO_Own*$_{t-1}$	−0.029	−0.016*	0.010	0.058*	0.256***
	(0.185)	(0.069)	(0.507)	(0.087)	(0.000)
(6) *CEO_Own*$_{t-1}$^2	0.002	0.002***	0.001	−0.004*	−0.015***
	(0.194)	(0.009)	(0.393)	(0.087)	(0.000)
(7) *CEO_Own*$_{t-1}$ *	0.048*	0.021**	0.020	−0.059*	−0.330***
Founder	(0.097)	(0.021)	(0.196)	(0.089)	(0.000)
(8) (*CEO_Own*$_{t-1}$^2) *	−0.002	−0.002***	−0.001	0.004*	0.016***
Founder	(0.155)	(0.006)	(0.242)	(0.087)	(0.000)
Founder	−0.143	−0.207***	−0.065	0.002	0.860***
	(0.147)	(0.000)	(0.219)	(0.985)	(0.000)
Firm_size	0.046***	−0.013***	−0.028***	−0.032*	−0.168***
	(0.000)	(0.006)	(0.001)	(0.083)	(0.000)
FTE	−0.020*	−0.003	−0.020	−0.053*	0.004
	(0.056)	(0.708)	(0.156)	(0.087)	(0.923)
Surety	−0.515***	0.025	−0.010	0.251**	0.178
	(0.000)	(0.417)	(0.854)	(0.031)	(0.234)
CEO_tenure$_{t-1}$		−0.018*	−0.018	−0.272***	0.008
		(0.057)	(0.259)	(0.000)	(0.857)
Firm age$_{t-1}$		0.001	−0.075***	−0.030	−0.206***
		(0.913)	(0.000)	(0.422)	(0.000)
MTB$_{t-1}$		−0.097**	−0.259***	0.397***	−0.214
		(0.024)	(0.000)	(0.015)	(0.308)
Debt ratio$_{t-1}$		−0.124	0.356***	−1.399***	−0.372
		(0.142)	(0.014)	(0.000)	(0.368)
%institutional		0.314***	0.273***	−0.364**	0.975***
ownership$_{t-1}$		(0.000)	(0.001)	(0.046)	(0.000)
Sum of beta coeff. of (1), (2), (3), and (4)	0.488				
Wald test for joint significance *p*-value for (1), (2), (3), and (4)	(0.026)**				

(Continued)

TABLE 6
Continued

	IV (2SLS) Estimation				
	2nd-Stage Regression I	1st-Stage Regression			
	Log (*%long tail*)	II *%outsider*$_{t-1}$	III *b_size*$_{t-1}$	IV *Indep_chair*$_{t-1}$	V *Incentive*$_{t-1}$
p-value for (5) and (6)	(0.415)				
p-value for (5), (6), (7), and (8)	(0.000)***				
F-test for excluded instruments		10.56***	9.61***	17.49***	8.17***
F-value	17.60	16.51	9.89	5.74	17.86
No. of obs.	404	404	404	404	404

Notes: This table reports estimation results of Equation (1) using 2SLS. The four IVs used in the first-stage regression are the log of CEO tenure (*CEO_tenure*), the log of firm age (*Firm_age*), the market-to-book ratio (*MTB*), and the percent of common stock owned by institutional investors (*%institutional ownership*). Variables are as defined in Table 3. All models include a constant, year dummies, and a dummy for whether a firm belongs to a group. Coefficient estimates on these variables are not reported to conserve space. The p-values are reported in parentheses below the coefficient estimates. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

of board structure and CEO pay. For example, Boone et al. (2006), Coles, Daniel, and Naveen (2008) and Linck, Netter, and Yang (2008) find that firm age, growth opportunities, leverage, CEO tenure, and ownership structure are important determinants of board structure. Smith and Watts (1992) find that firms with greater growth opportunities employ more incentive pay. Anecdotal and academic evidence both underscore that institutional investors have a significant impact on CEO pay (see, e.g., Hartzel and Starks, 2003). Those factors are also likely to be uncorrelated with the disturbance term. Firm age and holdings by institutional investors are externalities that are beyond the control of the current management. Debt and MTB ratios proxy the supply of capital in the external capital market and the market's perception of a firm's future growth potential. Although CEO tenure correlates with many firm characteristics, it is also a function of many factors that occur exogenously to the firm, including CEO health and the external labor market. Since the four governance variables are lag values, we also lag our instruments by 1 year.

We report regression results from using two-stage least squares (2SLS) estimating Equation (1) in Table 6. As column I of Table 6 shows, we obtain similar results for our governance variables. The joint test of the four governance variables is positive and significant at the 5 percent level. The F-tests for the first stage regressions all have p-values at better than the 1 percent level, suggesting that the IVs correlate with the governance variables. The Sargan statistic for the over-identification test has a chi-square p-value of 0.1493, thus fails to reject the null that the IVs are orthogonal to the error term.

Estimation Using SEM. In this section, we estimate an SEM to control for potential endogeneity. Assuming the model is properly specified, the SEM can shed light on

TABLE 7
Simultaneous Equations Estimation Results

	Simultaneous Equations Estimation (3SLS)			
	I *Log(%long tail)*	II *%outsider*	III *b_size*	IV *Incentive*
Log(*%long tail*)		0.077 (0.118)	−0.180** (0.027)	−0.958*** (0.001)
(1) *%outsider*	−0.289** (0.052)		1.683*** (0.000)	3.308*** (0.000)
(2) *b_size*	0.343*** (0.000)	0.492*** (0.000)		−2.317*** (0.000)
(3) $Indep\_chair_{t-1}$	0.024* (0.064)	0.067*** (0.000)	−0.128*** (0.000)	−0.329*** (0.000)
(4) *Incentive*	−0.002 (0.897)	0.085*** (0.000)	−0.155*** (0.000)	
(5) *CEO_Own*	0.018** (0.053)			0.015*** (0.002)
(6) *CEO_Own^2*	−0.001** (0.027)			
(7) *CEO_Own * Founder*	−0.022** (0.034)			
(8) (*CEO_Own^2*) * *Founder*	0.001** (0.033)			
Founder	0.017 (0.738)	−0.212*** (0.000)	0.377*** (0.000)	0.425** (0.045)
Firm_size	0.023*** (0.000)			
FTE	−0.012* (0.102)			
Surety	−0.485*** (0.000)			
ROA		−0.100 (0.246)		
CEO_tenure		−0.005 (0.359)		
SOX dummy		0.055*** (0.001)	−0.087*** (0.010)	
D&O_Own		−0.004*** (0.000)	0.007*** (0.000)	
Log(*MVE*)		0.045*** (0.000)	−0.088*** (0.000)	−0.447*** (0.000)
Firm_age			−0.021 (0.137)	
MTB				0.112 (0.185)
RET				0.187 (0.146)
RET_volatility				−0.346 (0.741)

(Continued)

TABLE 7
Continued

	Simultaneous Equations Estimation (3SLS)			
	I *Log(%long tail)*	II *%outsider*	III *b_size*	IV *Incentive*
Sum of beta coeff. of (1), (2), (3), and (4)	0.262			
Wald test for joint significance				
p-value for (1), (2), (3), and (4)	(0.000)***			
p-value for (5) and (6)	(0.002)***			
p-value for (5), (6), (7), and (8)	(0.000)***			
Wald chi-square value	668.10	502.93	283.33	260.74
No. of obs.	388	388	388	388

Notes: This table reports regression results from estimating simultaneous equations model with 3SLS. All models include a constant. In addition to the constant, model I also includes year dummies and a dummy for whether a firm belongs to a group. Model IV also include year dummies. Coefficient estimates on the constant, year dummies, and group dummy are not reported to conserve space. Variables are as defined in Table 3. The *p*-values are reported in parentheses below the coefficient estimates. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

the causal relations between governance controls and the level of managerial discretion and the potential complementary or substitution effects among the governance controls. The model specification for the SEM is as follows:

$$\begin{aligned}
\log(\%long-tail_{i,t}) &= \alpha + \gamma_1\, endog_var_{i,t} + \varpi\, Indep_chair_{i,t-1} + \beta_1 CEO_Own_{i,t} \\
&\quad + \beta_2 CEO_Own_{i,t}{}^{\wedge}2 + \beta_3 CEO_Own_{i,t} * Founder_i \\
&\quad + \beta_4 \left(CEO_Own_{i,t}{}^{\wedge}2\right) * Founder_i + \beta_5\, Founder_i \\
&\quad + \beta_6\, Firm_size_{i,t} + \beta_7\, FTE + \beta_8\, Surety + \beta_9\, Group \\
&\quad + Year_dummies \\
\%\, outsider_{i,t} &= \alpha + \gamma_1\, endog_var_{i,t} + \varpi\, Indep_chair_{i,t-1} + \beta_1\, ROA_{i,t} \\
&\quad + \beta_2\, CEO_tenure_{i,t} + \beta_3\, D\&O_Own_{i,t} + \beta_4 \log(MVE)_{i,t} \\
&\quad + \beta_5\, Founder_i + \beta_6\, SOX \\
b_size_{i,t} &= \alpha + \gamma_1\, endog_var_{i,t} + \varpi\, Indep_chair_{i,t-1} + \beta_1\, D\&O_Own_{i,t} \\
&\quad + \beta_2\, Firm_age_{i,t} + \beta_3 \log(MVE)_{i,t} + \beta_4 Founder_i + \beta_5 SOX \\
incentive_{i,t} &= \alpha + \gamma_1\, endog_var_{i,t} + \varpi\, indep_chair_{i,t-1} + \beta_1 CEO_Own_{i,t} \\
&\quad + \beta_2\, MTB_{i,t} + \beta_3\, RET_{i,t} + \beta_4 \log(MVE)_{i,t} + \beta_5\, Ret_volatility_{i,t} \\
&\quad + \beta_6\, Founder_i + Year_dummies, \qquad (2)
\end{aligned}$$

where *endog_var* is short-hand for the four governance variables (*%long-tail*, *%outsider*, *b_size*, and *incentive*) to be estimated in SEM. We use three-state least squares (3SLS) to control for the potential correlation among the error terms across equations.[24] We motivate the selection of the exogenous variables based on the existing literature and the need to identify the system.

The first equation is our Equation (1). In the second equation, *%outsider*, we include *ROA* and the log of CEO tenure (*CEO_tenure*) to proxy for CEO power. Hermalin and Weisbach (1998) argue that powerful CEOs have greater negotiation power to nominate insiders to the board, and suggest firm performance and CEO tenure as empirical proxies. Boone et al. (2007) and Linck, Netter, and Yang (2008) find empirical support for Hermalin and Weisbach. We include the log of market value of equity (*log*(*MVE*)) and director and officer ownership (*D&O_Own*), because Boone et al. and Linck, Netter, and Yang find that firm size and insider ownership have a significant impact on board structure. For reasons discussed earlier, we also include dummies to control for the effect of SOX and founder firms. In the third equation, *b_size*, we include D&O ownership and the log of firm age (*Firm_age*)) based on the findings in Boone et al. and Linck, Netter, and Yang. Again, we control for the effect of SOX and founder firms in this equation.

In the fourth equation, *Incentive*, we use the MTB ratio to proxy for growth opportunities (Smith and Watts, 1992) and control for stock return (*RET*) since incentive pay is based on firm performance. We include CEO ownership (*CEO_Own*), because CEOs with large equity ownership are more likely to act in the interests of shareholders and, hence, should require less incentive pay. We use annualized standard deviation of 12-month stock returns (*RET_volatility*) to proxy for information asymmetry (Fama and Jensen, 1983). Holmstrom (1979) argues that incentive pay should correlate positively with information asymmetry. For reasons discussed earlier, we also control for the effect of founder firms and the presence of a potential time trend using year dummies.

Estimation results from the SEM are reported in Table 7. As column I shows, our results hold within a SEM framework. Columns II and III suggest a complementary relation between *%outsider* and *b_size*. This result, together with the significantly negative coefficient of *%outsider* and the significantly positive coefficient of *b_size* in column I, supports the notion that independent directors, albeit better monitors, face greater information gathering, dissemination, and communication costs. Coles, Daniel, and Naveen (2008) find that boards of small size and fewer independent directors are more effective at monitoring for firms with high information costs. Columns II and IV show a complementary relation between *Incentive* and *%outsider*, consistent with the findings in Mayers and Smith (2010).

The relations between our four governance variables and other firm characteristics are generally consistent with the existing literature, lending us confidence that our SEM is correctly specified. For example, consistent with Boone et al. (2007) and Linck, Netter, and Yang (2008), we find that large firms have larger and more independent boards and that lower D&O ownership is associated with smaller and less independent

[24] The SEM does not include an equation for *Indep_chair* for identification considerations. The three attributes of board structure share common economic determinants (Linck, Netter, and Yang, 2008). However, we do control for the potential effect of *Indep_chair*, by including the lag value of *Indep_chair* as independent variable in all regressions.

boards. Consistent with Linck, Netter, and Yang (2009), SOX significantly increases board size and independence. Consistent with our earlier results, founder firms have smaller and less independent boards.

CONCLUSION

In this article, we examine the incremental impact of corporate governance controls in mitigating managerial discretion costs after controlling for the incentive alignment of managerial ownership. We achieve this through applying the MDH of Mayers and Smith (1981) to publicly traded P&L insurers. To date, abundant evidence has been produced supporting the MDH. Firms with different sets of corporate governance tools (i.e., different ownership structures) will experience comparative advantages in addressing managerial discretion costs. We argue that the same economic principles of comparative advantages should apply to firms that have the same set of governance tools but utilize the tools differently. Specifically, we hypothesize that publicly traded insurance companies with more stringent corporate governance should enjoy contracting advantages in mitigating costs of managerial discretion.

Consistent with our hypotheses, we find a significant positive relation between the stringency of governance controls and specialization in lines of insurance with high levels of managerial discretion for a sample of 72 publicly traded P&L insurers from 1994 to 2006. We measure the stringency of governance controls as the fraction of independent directors, small board size, whether an independent director is the chairman of the board, and CEO pay-for-performance sensitivity. We also find evidence of complementary effects between board independence and pay-for-performance sensitivity.

Our results hold after controlling for CEO ownership, highlighting the incremental importance of corporate governance in mitigating managerial discretion costs. Our findings also hold when we control for the impact of regulation and the potential influence of other governance mechanisms, such as charter provisions, outside blockholders, and distribution policy. Our findings are also robust to alternative estimation methods including IV and SEM.

APPENDIX: DETAILS ON THE CONSTRUCTION OF THE VARIABLE OF INCENTIVE

We consider the entire option portfolio for the CEO, which is composed of options granted in the current year and those held from grants in previous years. We use the 1-year approximation (OA) method of Core and Guay (1999, 2002) to calculate the value and sensitivity of the CEO's option portfolio. The Core and Guay OA method allows us to use data from only the most recent proxy statement, obtainable from ExecuComp, as opposed to the full-information method where we would have to collect data from as many as 10 proxy statements for an option of 10-year maturity. (The average option maturity is 10 years.) Core and Guay (2002) demonstrate that their OA method produces unbiased estimates that capture more than 99 percent of variation in option portfolio value and sensitivity. We summarize our calculation further.

We use the Black–Scholes model to calculate the option value:

$$Option\,value = Se^{-dt}N(Z) - Xe^{-rt}N(X - \sigma \times \sqrt{t}),$$

where

S = the stock price;
d = the dividend yield;
t = the time-to-maturity;
N= the cumulative probability function for normal distribution;
$Z = \frac{\ln(S/X)+(r-d+0.5*\sigma^2)\times t}{\sigma\times\sqrt{t}}$;
X = the exercise price;
σ = is the expected stock return volatility;
r = the risk-free rate.

The sensitivity of the option is $\frac{\partial(Option\ value)}{\partial S}$, also referred to in the literature as the option delta or the hedge ratio (Core and Guay, 2002, p. 629) and Yermack (1995, p. 252).

$$\frac{\partial(Option\ value)}{\partial S} = e^{-dt} * N(Z) = e^{-dt} * N\left(\frac{\ln(S/X) + (r - d + 0.5 * \sigma^2) \times t}{\sigma \times \sqrt{t}}\right).$$

Incentive is the pay-for-performance sensitivity that measures the change in the CEO option portfolio per $1,000 increase in shareholder wealth (Jensen and Murphy, 1990).

$$Incentive = \left(\frac{\partial(Option\ value)}{\partial S}\right) * \left(\frac{Number\ of\ options\ held\ by\ the\ CEO}{Total\ number\ of\ shares\ outstanding\ of\ the\ firm}\right) * 1,000.$$

To calculate the value of option granted in the sample year, we use the following inputs:

	Input Description and Source
S	• Following Jensen and Murphy (1990) and Core and Guay (2002), we use the end-of-fiscal-year price as the stock price at the time of the grant. • We obtain the stock price (PRCC_F) from Compustat.
d	• ExecuComp uses the average 3-year dividend to compute their Black–Scholes option value. • We follow this convention and get the dividend yield (BS_YIELD) from ExecuComp.
t	• ExecuComp uses July 1st to compute time-to-maturity and assumes that options will be exercised 70 percent through their term. Following these conventions, we compute t as the option expiration date minus July 1st of the sample fiscal year. • We obtain the option expiration date (EXDATE) from ExecuComp.
X	• We obtain the exercise price (EXPRIC) from ExecuComp.
σ	• Following Jensen and Murphy (1990) and Aggarwal and Samwick (2003), we calculate sigma as the annualized standard deviation of monthly total returns to shareholders over the 60 months preceding the sample fiscal year. Following Aggarwal and Samwick (2003), we exclude the observation if it has fewer than 12 monthly stock returns. • We obtain monthly stock returns (RET) from CRSP.
r	• ExecuComp uses the 7-year Treasury bond rate as the risk-free rate in computing their Black–Scholes option value. • We follow this convention and get the risk-free rate (*Risk_Free_Rate*) from the webpage titled "Input for Black–Scholes Calculations" on WRDS.

To calculate the value of option granted in the previous years, we use the OA method. Of the six inputs required to compute the option value, the exercise price and time-to-maturity are not directly available for previously granted options. Following Core and Guay (2002, p. 617), we use the realizable values of the unexercisable and exercisable options to compute the exercise price. Specifically, ExecuComp has the numbers and realizable values of unexercised *exercisable* options (OPT_UNEX_EXER_ NUM, OPT_UNEX_EXER_EST_VAL) and the numbers and realizable values of unexercised *unexercisable* options (OPT_UNEX_UNEXER_ NUM, OPT_UNEX_UNEXER_ EST_VAL) held by executives at fiscal year-end that were vested. Since realizable value is the aggregate "in-the-moneyness" of option, that is, (*Realizable value = (Stock price – Exercise price) * Number of options*), we get the exercise price by dividing the unexercisable and exercisable realizable values by the number of unexercisable and exercisable options and subtract the division from the stock price. Since we calculate the option granted this year separately, we exclude newly granted options from the unexercised *unexercisable* option.

To get time-to-maturity for previously granted options, we also follow Core and Guay (2002, p. 618). If a firm grants options in the most recent fiscal year, we set the time-to-maturity of previously granted *unexercisable* options to the time-to-maturity of the recent option grant minus 1 year and the time-to-maturity of previously granted *exercisable* options to the time-to-maturity of the recent option grant minus 4 years. If no grant is made in the most recent fiscal year, we set the time-to-maturity of previously granted *unexercisable* options to six and the time-to-maturity of previously granted *exercisable* options to three.

We obtain the number of newly granted options, the number of *unexercisable* options, the number of *exercisable* options, and the number of share outstanding from ExecuComp.

The incentive of the CEO option portfolio is the sum of the sensitivity of newly granted options, *unexercisable* options and *exercisable* options.

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