

Incentives and risk taking: Evidence from listed US insurance companies

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Abstract

This study examines the relation between incentives and risk taking for 104 listed US insurance companies over 2006-2010. Our results show that independent director compensation is positively related to risk taking as are CEO compensation and institutional ownership. Besides dollar value and proportion of stock based compensation, we document similar results with total compensation. In terms of institutions, dedicated institutional ownership rather than total institutional ownership is found positively related to risk taking. These findings suggest that the stock based compensation of independent directors and the CEO help to align their interests with that of the shareholders when dedicated institutional owners serve as external monitors. Our results are robust to several methods, different risk taking measures and a wide range of control variables.

JEL classification: G22, G28, G32, G34, G38

Keywords: Board compensation; CEO compensation; institutional ownership; SFAS 123R; risk taking; pooled OLS with Driscoll and Kraay standard errors

1. Introduction

This study examines the relation between the incentives and risk taking for listed insurance companies in the US. It does so by considering the compensation paid to CEOs and directors as well as the impact of institutional ownership on insurance companies' total and market risk. The study is timely as following the global financial crisis several commentators have placed the blame, at least partly, on the executive and board compensation packages afforded major financial services companies.

Despite these comments, compensation at the board level has received much less academic attention than that of the CEOs even though the former is supposed to monitor the latter. Perhaps this reflects a view that compensation alone does not drive outside directors to do their job. The "reputation effect" is instead thought to be their key motivator.¹ While this may be true, compensation structure is nevertheless important in board effectiveness (Adams and Ferreira, 2008). The significant increase in total director fees, per director pay and proportion of equity to cash pay post the Sarbanes Oxley Act of 2002 (Linck et al., 2009) highlights the importance of director compensation. This is because the workload and risk of independent directors also have increased during the same period. Despite the importance of director remuneration, the compensation literature mostly covers the CEO. Although Deutsch et al. (2011) provide evidence of the joint effect of outside director and CEO stock option on firm risk taking, their findings may not be generalized due to sample selection, endogeneity

¹ Although Mace (1971) identified money, prestige and experience as the motives for outside directors, reputational benefit has received the most consideration. As Fama and Jensen (1983) noted, reputation is the main motivation for outside directors to use their expertise. The prior literature (Ferris et al., 2003; Fich and Shivdasani, 2006) has addressed this reputational incentive by examining multiple directorships. Multiple directorships, however, may "overboard" the outside directors and so may reduce their effectiveness (Core et al., 1999; Shivdasani and Yermack, 1999). On the same vein, the National Association of Corporate Directors and the Council for Institutional Investors recommend limiting the number of directorships held by directors of publicly traded companies (Fich and Shivdasani, 2006). Moreover, independent directors with multiple directorial appointments distribute more efforts to the larger firms (Masulis and Mobbs, 2012). Accordingly, firms may not benefit equally from appointing these reputed directors. If so, the outside director market would contract and hence reputation only may not offer them adequate incentives.

and compensation calculation.² Although exclusion of financial companies from corporate studies is common in finance research, their study includes both financial and non-financial corporations without controlling for industry differences. Moreover, they do not address endogeneity which is very important in the governance literature. Furthermore, Deutsch et al. (2011) does not distinguish between outside and independent directors.

Outside directors can include both independent and affiliated outside directors. As argued by Fich and Shivdasani (2006), affiliated directors may have other objectives than to monitor managers. So, compensation should influence independent directors but not affiliated ones. While the board of directors (BOD) itself sets the compensation for directors, the CEO and the institutional investors play a significant role with their negotiation power and external monitoring. A CEO's incentives are similarly provided through compensation and institutional investors' incentives are reflected through their shareholdings. Therefore, board compensation, CEO compensation and institutional ownership define board incentives due to their interconnectedness. The relation between board incentives and risk taking is largely unexplored in any context, but we examine the relation between board incentives and risk taking in listed US insurance companies due to their limited attention in the corporate governance literature. Whilst financial companies are excluded from governance studies due to their different regulatory system, insurance companies also differ from banks in terms of their regulation, business model, board structures and incentives.

While both banks and insurers operate in regulated environments, insurers are regulated differently. Bank regulation focuses mainly on solvency whereas insurance regulation covers both solvency and rates (price). Solvency regulation is designed to limit insolvency risk whereas price regulation prevents prices from rising above a competitive

² The other issues that can impede generalization of the Deutsch et al. (2011) findings include the sample period, choice of risk proxies and option measure, and control variables. Their data cover 1997-2006, but compensation disclosure has changed following the SFAS123R in 2006. The book-to-market ratio is used as their primary risk measure, but not total risk. In terms of compensation, they used only the nominal value of option.

level (Grace and Klein, 2008). In terms of business model, banks specialize in financial intermediation whereas insurance companies specialize in risk pooling. Their risk management also differs with insurers using several additional mechanisms, such as reinsurance, catastrophe bonds and options, and industry loss warranties, not commonly used by other organizations. Insurance companies are also unique regarding pricing. Whereas most firms know production cost in advance and so their price can provide a profit, insurers only know their actual costs after a policy has expired. Setting the right premium is crucial, but underwriting is similarly important as the determination of policyholders' risk levels impacts on the premiums charged and subsequent claims paid. As premiums can be invested until claims and expenses are paid, investments constitute the majority of insurance assets making insurance companies important institutional investors. Insurance companies also differ from non-financial corporations and banks in terms of their board structures (Podder et al., 2013). Moreover, their incentives structure is different as well as shown in Appendix A. Insurance companies pay higher total and stock based compensation to directors and CEO than non-financial corporations and banks. All these unique features motivate us to examine the relation between incentives and risk taking in an insurance context.

Our sample consists of 466 insurer-year observations over 2006-2010 of 104 unique US direct insurers selected from Compustat and the Corporate Library databases.³ As the risk measures are continuous variables, we follow Bebchuk et al. (2009) and Mayers and Smith (2010), and use the ordinary least square (OLS) regression method with robust standard errors to test the related hypotheses. While robust standard errors correct for heteroskedasticity, this does not address for cross sectional correlation (Hoechle, 2007).

³ The US is chosen because it is the world's major insurance market collecting more than one third of the total worldwide insurance premium. It is larger than the total of the next four largest markets (III, 2010). In terms of sample period, we include the global financial crisis (GFC), but control for it using year dummies. As this study is limited to US, the GFC affected all insurers in a similar manner and cross sectional variations should not be a problem.

Pooled OLS regression with Driscoll and Kraay standard errors is robust to heteroskedasticity, autocorrelation, and cross-sectional dependence (Driscoll and Kraay, 1998; Hausman, 1978; White, 1980) and so is applied, following Deutsch et al. (2011), to account for these issues. Three-stage least squares (3SLS) regression is also applied to address the simultaneity among risk taking, board compensation and CEO compensation. Alternative compensation and risk proxies are included for robustness.

We find that board compensation is positively related to risk taking. We also show that CEO compensation and institutional ownership are positively related to risk taking. These results are consistent for both compensation levels and compositions. Although our primary compensation measures are natural logarithm of stock based compensation and percentage of stock based compensation over total compensation, we provide similar results for natural logarithm of total compensation. In terms of institutional ownership, dedicated institutional ownership, rather than total or quasi or transient institutional ownership, is significantly related.⁴ These findings suggest that the stock based compensation of the CEO and independent directors help align their interests with that of the shareholders when dedicated institutional owners serve as external monitors.

This study contributes to the literature in several ways. As far as it could be ascertained, it is the first to document that board compensation is positively related to risk taking. It extends the Deutsch et al. (2011) study by including total compensation, stock based compensation and proportion of stock based compensation over total compensation of the independent directors rather than just their option compensation. Moreover, we also include CEO compensation and institutional ownership in the same framework to address the

⁴ Bushee (1998) classified institutional investors, using factor analysis and cluster analysis, into three types; dedicated, quasi-indexing and transient. Dedicated institutions have high concentration, low turnover, and almost no trading sensitivity to current earnings. Quasi-indexers exhibit high diversification, low turnover, and low trading sensitivity to current earnings, which are consistent with most buy-and-hold value strategies. Transient institutions have relatively high diversification, the highest turnover, and highest trading sensitivity to current earnings. The generosity of Professor Brian Bushee is highly acknowledged for sharing his program to perform this classification. This classification has been used in recent studies (e.g., Dhaliwal et al., 2011).

simultaneity between board compensation and CEO compensation, and the effect of external monitoring on the compensation setting. As regards to our board compensation measure, it is similar to Ertugrul and Hegde (2008), but differs from them by including compensation of only independent directors rather than all outside directors. In terms of the CEO compensation, it is similar to Chen et al. (2006), Coles et al. (2006) and Wen and Chen (2008), but differs from them by including the stock based compensation and its composition rather than just option compensation. The positive relation between dedicated institutional ownership and risk taking is also new. As most of the findings are applicable for any context, this study contributes to the general corporate governance and insurance literature.

The remainder of the paper is structured as follows. Section 2 presents a literature review on risk-taking and our hypotheses development. Section 3 describes the data and methodology. Section 4 provides the empirical results while Section 5 shows the robustness of the results. Finally, Section 6 concludes the paper.

2. Related literature and hypotheses development

2.1. Board compensation and risk taking

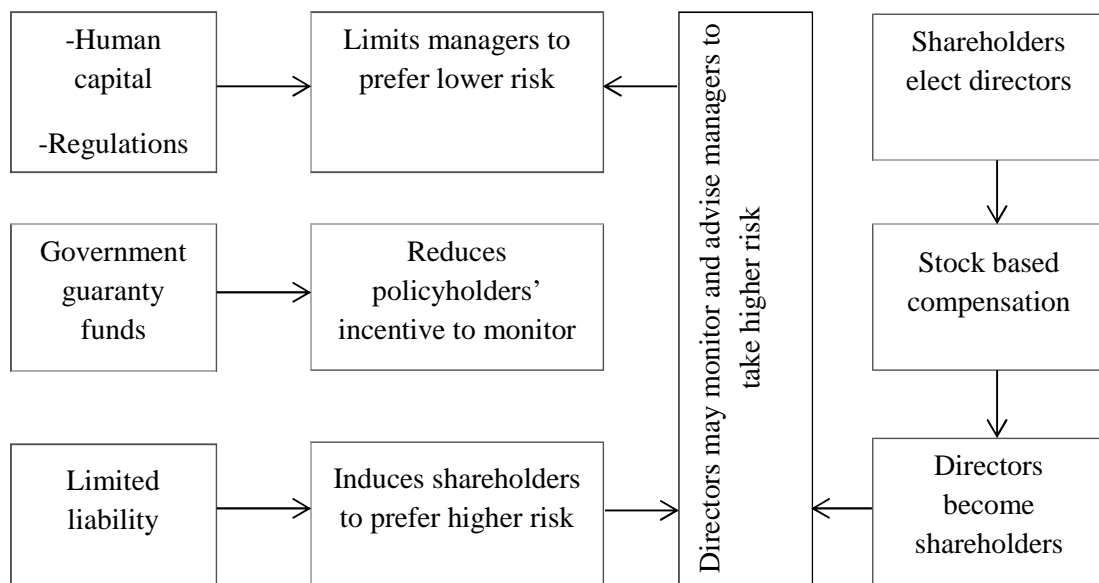
Board compensation refers to the compensation paid to the independent directors.⁵ Contrary to the popular view that financial compensation provides very little incentives for outside directors, Adams and Ferreira (2008) document that even a small meeting fee reduces attendance problems and emphasizes the importance of monetary incentives.⁶ Of special

⁵ The compensation paid to the independent directors is considered here as board compensation. This is because only independent directors on the board are elected for monitoring purposes. While total compensation includes the sum of cash, stock awards, option awards, non-equity incentive plans, change in pension plans and deferred compensation, and all other compensation, this study mainly covers stock based compensation of the independent directors as the board compensation. Stock based compensation is defined as the sum of stock awards and option awards.

⁶ Despite the common perception that director compensation is trivial, the average board compensation (i.e., compensation of all outside directors on a board) is almost the same as the average compensation of the CFO, and one fourth of the average compensation of the CEO for the S&P 1500 firms over 2006-2010.

importance is the inclusion of stock based compensation (stock and option) in the outside directors' remuneration package. This helps mitigate the agency problems by offering the non-employee directors to become shareholders and so align their incentives to maximize shareholder benefit (Ertugrul and Hegde, 2008; Maug, 1997; Ronen et al., 2006).⁷

Figure 1: Link of directors' stock-based compensation and insurer risk taking



Source: Author's own design

As shown in Figure 1, shareholders in listed insurers prefer higher risk and stock based compensation helps to align the outside directors' interest with that of the shareholders.⁸ So, stock based compensation should be positively associated to insurer risk

⁷ Although the policyholders, shareholders and managers all have direct interest in the insurance business, the policyholders are less motivated to monitor managers as state guaranty funds will pay their claims if their insurers fail. Shareholders, unlike policyholders, are motivated to encourage managers to take higher risk. This preference stems from the moral hazard arising from their limited liability position and the protection that state guaranty funds provide policyholders (Cummins and Sommer, 1996; Galai and Masulis, 1976).

⁸ Managers have two opposite views towards risk taking: risk aversion and expropriation. Managers may be risk averse as their human capital, built through their experience and talent, ties to the firm and its success (Smith and Stulz, 1985). So, career concerns and the inability to diversify their risk in the capital market cause them to be risk averse (Amihud and Lev, 1981; Demsetz and Lehn, 1985). If they do seek risky assets, these may be confined to manager specific assets (i.e., assets whose value is higher under the current manager) and so makes them more costly to replace as well as supporting higher wages and more perquisites (Shleifer and Vishny,

taking. A positive relation between outside directors' option compensation and firm risk is documented by Deutsch et al. (2011). As option compensation is a part of stock based remuneration and also aligns outside directors' interest with the shareholders (Ryan and Wiggins, 2004), their study indicates that outside directors' stock based compensation should be related to firm risk.

Most compensation studies include only non-financial corporations. Although regulation is cited as the main reason for excluding financial companies, regulated firms use similar equity based compensation (Becher and Frye, 2011). Banks, for example, utilize high degrees of equity based compensation for outside directors to align their interest with shareholders (Becher et al., 2005). The insurance industry shares a similar stringent regulatory environment with the banking industry (Wen and Chen, 2008) and so is expected to have a similar compensation structure. Hence we develop the following hypothesis regarding stock based compensation and risk taking.

H1: Board compensation is positively related to insurer risk taking.

2.2. CEO compensation and risk taking

CEO compensation is set by the board, but it is not just the total compensation but also its structure that is important.⁹ This is because an optimal contract developed through compensation design could mitigate agency conflict (Holmstrom, 1979). The process of determining compensation, however, is described as a negotiation between the board and the CEO. For instance, Hermalin and Weisbach (1998) model a bargaining game in which the selection of directors and the CEO's compensation are negotiated between the two parties. As

1989). In contrast, expropriation behavior is more difficult due to the strict solvency regulation and so may make the managers risk averse.

⁹ While total compensation for the CEO is measured as the sum of salary, bonus, stock awards, option awards, non-equity incentives, change in pension and deferred compensation and all other compensation, we primarily use stock based compensation of the CEO here as CEO compensation. Stock based compensation is defined as the sum of stock awards and option awards.

a result, the CEO's power over the board of directors may distort optimal compensation contracts (Bebchuk et al., 2002). The central issues in the bargaining and negotiation literature include board independence, the power of the CEO and one party exercising control over the other.

The board may not prove as an effective monitor if its culture inhibits constructive criticism. One such board culture could be cronyism, which can result in excessive compensation and weak monitoring. As documented by Brick et al. (2006), director and CEO compensation are positively associated in such cultures. The Brick et al. (2006) evidence of cronyism covers the total and cash compensation of directors and CEO over 1992-2001. Alternatively, a positive relation between the CEO and directors' compensation could exist if the firm is large and complex as such complexity affects the skill and effort required by both parties. With the new disclosure and option expensing requirement (SFAS 123R), there is a significant change in the compensation design.¹⁰ Stock based compensation increased post-SOX, but this is perhaps due to other reasons such as increased work load (Linck et al., 2009). Such compensation is viewed as an incentive mechanism that aligns the interest of managers and directors with shareholders. Like Chen et al. (2006) in banks, and Coles et al. (2006) in the corporate context, Wen and Chen (2008) provide empirical support for CEO option compensation and risk taking in the insurance industry. Given stock compensation aligns

¹⁰ SFAS 123R denotes Statements on Financial Accounting Standards 123 Revised. US firms used to report their equity-based compensation under FAS 123. While FAS 123 encouraged the use of fair value (e.g., the Black-Scholes value of the option on the grant date) in measuring compensation cost, the standard allowed firms to continue recording compensation expense on the income statement using the intrinsic value (the difference between the market price of the stock and the exercise price, if any) method following the Accounting Principles Board (APB) opinion 25 and provide pro-forma footnote disclosure of the fair value compensation expense numbers. Prior to SFAS 123R, most firms used the intrinsic value method. Because the exercise price of fixed stock options is commonly set to the stock price on the grant date, no compensation expense was recorded under this method. In 2004, the FASB issued SFAS 123R that required the use of fair values in the income statement. SFAS 123R became effective for large public firms for the first reporting period beginning after June 15, 2005. The most notable accounting difference with SFAS 123R relates to the treatment of fixed stock options, in which the number of shares and exercise price are known at the grant date. Under SFAS 123R, the compensation cost of all employee stock options is measured using fair value, so fixed options now result in compensation expense on the income statement. Although this SFAS 123R affects other forms of equity-based compensation, option expensing is more pronounced. See Hayes et al. (2012) for a detail review on SFAS 123R.

incentives in much the same way as option compensation, CEO compensation and risk taking should be positively related and so justifies the following hypothesis.

H2: CEO compensation is positively related to insurer risk taking.

2.3. Institutional ownership and risk taking

As discussed in Section 2.1 and Section 2.2, stock based compensation for independent directors and the CEO reduces two types of agency problems; (1) conflict between shareholders and managers, and (2) conflict between outside directors and managers. While the board approves its own as well as CEO compensation, institutional share owners play an active role in monitoring the board and its compensation setting (Hartzell and Starks, 2003). Thus more institutional holdings should ensure that right incentives are offered to the independent directors and the CEO for higher risk taking. As institutional holdings in US companies grew from 6.1% of aggregate ownership of equities in 1950 to over 50% by 2002, their role as external monitors has become even more pronounced. Indeed, Wright et al. (1996) show a positive influence of institutional ownership on risk taking. Cheng et al. (2011) also finds a positive association between these two in life insurers, but their sample does not include non-life insurers. Given their monitoring role, institutional investors are expected to be positively related to risk taking of both life and non-life insurance companies and hence we formulate the following hypothesis.

H3: Institutional ownership is positively related to insurer risk taking.

3. Data and empirical method

3.1. Sampling procedure, composition and coverage

The data were collected from a number of sources including Standard and Poor's Compustat North America, the Corporate Library, Securities and Exchange Commission's EDGAR database, Standard and Poor's Execucomp, the University of Chicago's Center for Research in Security Prices (CRSP), Thomson Reuters Form 13F filings, Thomson Reuters Institutional Brokers' Estimate System (I/B/E/S), and the Federal Reserve Bank (FRB) of St. Louis. Compustat North America was accessed for insurers' financial data. The Corporate Library provided board structure (such as gender diversity, busy boards and experienced boards), director ownership, CEO age, CEO tenure and poison pill data. EDGAR and Execucomp were the sources for compensation, CEO ownership, board independence, board characteristics (such as board size and CEO-Chairperson duality), block ownership, inside ownership and staggered board provision data.¹¹ CRSP was the source for market data. Thomson Reuters Form 13F filings supplied institutional ownership data while Thomson Reuters Institutional Brokers' Estimate System (I/B/E/S) covered the number of analysts following each insurer. The Federal Reserve Bank of St. Louis was accessed for Treasury yield.

As summarised in Table 1, the sample begins with all insurers covered by Compustat financial services (FS) over 2003-2010. The 2003 commencement is because it is the first year after the Sarbanes Oxley (SOX) Act 2002 while 2010 was the latest available during the data collection phase. Post-SOX period was selected due to SOX's impact on board structure, activities and compensation.

¹¹ Compensation data were hand collected from the DEF14A proxy files of the EDGAR database. As our sample insurers cover more than the insurers reported with the Execucomp, the hand collected compensation data is cross checked with Execucomp insurers. The hand collected data proved reliable as the matched insurers had the same compensation data as with Execucomp.

[INSERT TABLE 1 ABOUT HERE]

Compustat includes 1,181 insurer-year observations over 2003-2010 of which 279 related to either non-US incorporated insurers or insurance agents and are excluded to restrict the sample to US incorporated direct insurers.¹² A matching of the remaining 902 with the Corporate Library data files produces 683 insurer-year observations. The 219 lost observations reflect the Corporate Library's poorer coverage during 2003-2005. When the Compustat and the Corporate Library insurers are combined, 16 more observations, related to insurers having only one year of data or a non-December fiscal year end, were dropped, leaving 667 observations over 2003-2010. Due to the unavailability of director stock and option compensation in some DEF14A proxy files, 198 insurer-year observations over 2003-2005 were dropped. After their removal three more observations of insurers with just one year of data were dropped as the sample insurers require at least two years of data. The combined sample after cleaning stands at 466 insurer-year observations. The actual sample varies across models due to the different data requirements and their availability for calculating different variables.

3.2. Measures of insurance risk taking

Two measures of risk taking, total risk (*TOTR*) and systematic risk (*SYSR*), are used in this study following prior insurance studies (e.g. Chen et al., 2006; Cheng et al., 2011; Downs and Sommer, 1999; Wen and Chen, 2008). Total risk (*TOTR*) (market based) of an insurer is calculated, following Downs and Sommer (1999), and Cheng, Elyasiani, and Jia (2011), as the standard deviation of the daily stock returns for each fiscal year. Systematic risk (*SYSR*) is calculated with a two factor model following Chen et al. (2006) and Wen and Chen (2008).

¹² We consider only US incorporated insurers due to the regulatory differences between US and other countries. We also cover only direct insurers whose major activity is writing insurance contracts.

Given the similarity between banks and insurance companies in terms of their sensitivity to interest rates, this model can also be applied for insurance.

$$R_{it} = \alpha + \beta_{1i}R_{mt} + \beta_{2i}I_{it} + \varepsilon_{it} \quad (1)$$

where, R_{it} is the daily return on insurer stock i , R_{mt} is the daily return on the CRSP value weighted index, I_{it} is the daily three-month T-bill yield, ε_{it} is a random error term, β_{1i} is the systematic risk for insurer i , and β_{2i} is the interest rate risk for insurer i .

Underwriting risk (UR) is measured by the percentage change in loss reserve following Ho et al. (2013). Loss reserve is a major liability for an insurer and so the primary input used to develop rates (premiums). Insurers exercise discretion both in measuring loss reserves and in determining rates to maximize their expected profits (Nissim, 2010). An increase in loss reserve, therefore, indicates a higher underwriting risk.

3.3. Measures of board incentives

As discussed in Section 1, board incentives include board compensation ($BCOM$), CEO compensation ($CCOM$) and institutional ownership ($IOWN$). Board compensation ($BCOM$) essentially measures the overall impact of changes in the supply and demand for directors (Linck et al., 2009). It denotes compensation at the board level rather of individual directors. Total board compensation is the aggregate of each independent director's total compensation. Total compensation for each independent director is the sum of cash, stock based and other compensation (e.g., non-equity incentive, changes in pension and all other compensation). Cash compensation, as reported in "proxy files", is the sum of meeting fees and annual retainer. Total stock based compensation is the sum of the stock and option compensation (Linck et al., 2009). As stock based compensation of independent directors aligns their interest with shareholders (as discussed in Section 2.1), the primary measure of board compensation ($BCOM$) used in this study is the dollar value of stock based

compensation of independent directors. Following Becher, Campbell, and Frye (2005), the percentage of stock based compensation to total compensation (*PBCOM*) is also used as a board compensation measure. This percentage indicates the relative importance of stock based compensation in the firm's director compensation plan. For additional analysis total board compensation (*BODTOTAL*) is also considered.

CEO compensation (*CCOM*) is included given its importance and relationship with board structure (Chhaochharia and Grinstein, 2009), ownership (Core et al., 1999) and board compensation (Linck et al., 2009). Following the incentive alignment theory, we incorporate the dollar value of stock based compensation of CEO (*CCOM*) and percentage of stock based compensation to total compensation (*PCCOM*) as the measure of CEO compensation the same way stock based compensation of independent directors has been measured. For additional analysis, the total CEO compensation (*CEOTOTAL*) is also considered.

Institutional ownership (*IOWN*) is included due to its influence in the compensation setting. It is measured, following Bushee (1998), as the ratio of shares held by dedicated institutional investors and total outstanding shares for each insurer at the last quarter of each fiscal year.¹³ This differs from Kim and Lu (2011) whose institutional ownership is just the sum of the ownership held by the top five institutional investors and from Larcker, Richardson, and Tuna (2007) institutional block holding of more than 5% outstanding shares.

3.4. Measures of control variables

The control variables, as summarized in Table 2, are included to capture board structure, board characteristics, chief executive officer (CEO) characteristics, ownership, external monitoring, other governance variables, and insurer characteristics.

[INSERT TABLE 2 ABOUT HERE]

¹³ The Bushee (1998) dedicated, as opposed to quasi-indexers and transient investors, was explained earlier in footnote 5.

Board structure includes board independence (*BIND*), gender diversity (*GDIV*), busy boards (*BBUS*), and experienced boards (*EBOD*). Board independence (*BIND*) is an important board structure as the increase in independent directors in the board also increases the board compensation (Linck et al., 2009). *BIND* is measured, following Hermalin and Weisbach (2003) as the number of independent directors as a percentage of the total number of board directors (i.e., board size, *BS*). Female directors are viewed to provide greater oversight (Adams and Ferreira, 2009) and may impact on board incentives. *GDIV* is measured as the female independent directors as percentage of all independent directors on the board. Busy boards (*BBUS*) refer to busyness of independent directors in terms of their engagement on the boards of other companies and is important due to their less effectiveness in monitoring. *BBUS* is measured as the average number of directorships held by the board's independent directors following Ferris et al. (2003). Experienced boards (*EBOD*) reflect on the directorial skills developed through serving on the boards and is important due to their ability to monitor managers effectively (Srinidhi et al., 2011). *EBOD* is measured, following Srinidhi et al. (2011), as the average number of years that independent directors have served on the board.

Board characteristics cover board size (*BS*) and duality (*DUAL*). Board size (*BS*) is an important board construct as it is found negatively related to performance (Yermack, 1996) and risk taking (Pathan, 2009). *BS* is measured as the number of all board members following Boone et al. (2007) and Wintoki et al. (2012). Duality (*DUAL*) refers to the same person occupying the post of CEO and chairperson of the board. *DUAL* is important as it leads to conflicts of interest, which may adversely affect the shareholders (Gul and Leung, 2004). It is measured, following Wintoki et al.(2012), as an indicator variable (0, 1) where 1 indicates if the CEO is also the chairperson of the board; otherwise 0.

CEO characteristics include CEO tenure (*CTEN*). CEO tenure (*CTEN*) reflects the bargaining power of the CEO (Boone et al., 2007) and is important due to its association with board composition. *CTEN* is measured, following Boone et al. (2007), as the number of years the CEO served as the insurer's CEO.

Ownership structure covers CEO ownership (*COWN*) and block ownerships (*BOWN*). CEO ownership (*COWN*) refers to CEO's control over insurer assets. While *COWN* may align CEO's and shareholders' interests, they may also contribute to the 'CEO power' (Baker and Gompers, 2003). It is measured as the fraction of the CEO's shareholding following Pathan (2009). As block ownership (*BOWN*) is important in constraining CEO power through monitoring, it is calculated, following Boone et al. (2007), as the number of shares owned by non-affiliated block holders who own 5% or more of outstanding shares.

External monitoring proxies include number of analysts following (*NOAF*) and audit quality (*AQ*). The number of analysts following an insurer (*NOAF*) is important as a greater following indicates more intense competition among analysts and may reduce information asymmetry issues via their monitoring (Behn et al., 2008). *NOAF* is computed, following Dhaliwal et al. (2012), as the monthly average of the number of analysts that follow an insurer each year. Audit quality (*AQ*) denotes a vital measure of external monitoring as higher risk firms are associated with higher quality auditors (Clarkson and Simunic, 1994). Following Feltham et al. (1991), *AQ* is measured as a dummy variable (1, 0) with 1 if the audit firm is one of big 4 auditors; otherwise 0.

For other governance variable, a proxy for shareholders' right protection index (i.e., G-INDEX) entrenchment index (*EINDEX*) is considered.¹⁴ Entrenchment index (*EINDEX*) is a proxy for G-INDEX following Pathan and Skully (2010) and Pathan (2009).

¹⁴ G-INDEX reflects the Gompers et al. (2003) index constructed of twenty four restrictive provisions believed to protect the shareholders from hostile takeovers. While these provisions protect shareholders, they may also entrench the managers. In line with this view Bebchuk et al. (2009) propose an entrenchment index (*EINDEX*) covering six of these twenty four provisions. Pathan and Skully (2010) include a proxy for *EINDEX*, constructed

Insurer level control variables include insurer size (*SIZE*), capital (*CAP*), investments (*INV*), and franchise value (*FV*) are included. Insurer size (*SIZE*) captures the complexity and scope of operation of an insurer. *SIZE* is also an important determinant of its risk taking because larger insurers are more inclined to employ more sophisticated financial instruments as well as reinsurance to manage and diversify risks (Cummins et al., 2001). *SIZE* is measured using two proxies: the natural log of total assets (Wen and Chen, 2008) and the natural log of market capitalization (Wintoki, 2012). Investments (*INV*) represent a major asset for insurers and so the performance of insurer depends largely on their investment. Hence, investment is included as the logarithm of total investment assets following Ho et al. (2013). Capital (*CAP*) is important for solvency and is positively correlated to risk (Cummins and Sommer, 1996). *CAP* is measured as the ratio of equity to total assets. Franchise value (*FV*) reflects a firm's profit generating potential and is important because it induces risk aversion (Staking and Babbel, 1995). Tobin's Q is used as a proxy for *FV* following Lindenberg and Ross (1981) and is calculated as the ratio of market value of assets and book value of assets. Market-to-book (*MB*) ratio captures the growth of a firm and so has an impact on performance (Wintoki et al., 2012). It is included as the ratio of market value of equity and book value of equity.

Insurance type (*ITYPE*) controls for the differences between life and non-life insurers in terms of operations, investments, duration of liabilities and investments, and vulnerabilities (Fields et al., 2012). *ITYPE* is measured, following Eling and Marek (2013), as a dummy variable with 1 for a life insurer; otherwise 0. Year dummies (*YEAR*) are included to eliminate the potential for any time effect following Pathan (2009).

as the sum of staggered boards and poison pill provisions, which Pathan (2009) includes as a proxy for G-INDEX.

3.5. Empirical framework

3.5.1. Empirical model

The following regression equation is formulated to test empirically the three main hypotheses; H1, H2 and H3 developed in Section 2.

$$\begin{aligned} Risk_{i,t} = & \beta_0 + \beta_1(Board\ incentives)_{i,t} + \beta_2(BIND)_{i,t} + \beta_3(BS)_{i,t} + \beta_4(DUAL)_{i,t} \\ & + \beta_5(CTEN)_{i,t} + \beta_6(COWN)_{i,t} + \beta_7(BOWN)_{i,t} + \beta_8(EINDEX)_{i,t} \\ & + \beta_9(ISIZE)_{i,t} + \beta_{10}(INV)_{i,t} + \beta_{11}(CAP)_{i,t} + \beta_{12}(MB)_{i,t} + \beta_{13}(AQ)_{i,t} \\ & + \beta_{14}(MERGER)_{i,t} + \beta_{15}(ITYPE)_{i,t} + \sum_{t=2007}^{2010} \beta_t(YEAR)_t + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where the subscripts i denote individual insurers ($i = 1, 2, \dots, 104$) and t is the time period ($t = 2006, 2007, \dots, 2010$). The coefficients $\beta_1, \beta_2, \dots, \beta_{15}$ are the parameters to be estimated, while ε denotes the disturbance term. Board incentives include three measures: board compensation ($BCOM$), CEO compensation ($CCOM$) and institutional ownership ($IOWN$). $BCOM$, $CCOM$ and $IOWN$ are separately estimated and reported in Section 5.

3.5.2. Estimation method

As the risk measures described in Sections 3.1 are continuous variables, following Bebchuk, Cohen, and Ferrell (2009) and Mayers and Smith (2010), Equation 2 is estimated using the ordinary least squares (OLS) method. The OLS estimations are based on three important assumptions regarding multicollinearity, heteroskedasticity and autocorrelation as their presence would otherwise make the estimates biased and inefficient. Multicollinearity is addressed by estimating the variance inflation factor (VIF) statistics following the regression. Heteroskedasticity is accounted for by including White (1980) standard errors in all OLS

models. Autocorrelation (alternatively, serial correlation) is corrected by clustering the firm identifiers in the OLS models.

3.6. Descriptive statistics

This section explains the descriptive statistics of the variables included in this study. The summary statistics are presented in Table 3 while the correlation matrix is covered in Table 4.

[INSERT TABLE 3 ABOUT HERE]

As discussed in Table 3, the average (median) board stock based compensation (*BCOM*) is US\$0.561 million (US\$0.400 million). The average (median) CEO stock based compensation (*CCOM*) is US\$2.335 million (US\$1.057 million). The average (median) percentage of board stock based compensation (*PBCOM*) is 39.05% (42.88%). The average (median) percentage of CEO stock based compensation (*PCCOM*) is 32.58% (33.20%). The average (median) board total compensation (*BODTOTAL*) is US\$1.162 million (US\$0.992 million). The average (median) CEO total compensation (*CEOTOTAL*) is US\$5.463 million (US\$3.269 million). The average (median) dedicated institutional ownership (*IOWN*) is 8.74% (5.23%) respectively.

In regards to board structure, the average (median) percentage of board independence of 71.4% (73.84%) is higher than the average board independence (*BIND*) reported by Pathan and Faff (2013) and Pathan (2009) of 70.91% and 64.52% reflecting the increase in board independence following SOX. The average (median) percentage of gender diversity (*GDIV*) of 13.53% (12.50%) is higher than Adams and Ferreira (2009) average of 8.5% reflecting the difference in the construction methodology. The average (median) directorships per independent director (*BBUS*) of 1.80 (1.61) is lower than Fich and Shivdasani (2006) average of 3.11. The average (median) experienced boards (*EBOD*) is 7.68 (7.10) years.

With regards to board characteristics, as shown in Table 3, the average (median) board size (*BS*) of 10.41 (10.00) is higher than the 9.35 of Ho et al. (2013) supporting the Linck et al. (2009) view that post-SOX boards are larger. 51.292% of the sample insurers combined both CEO and board chair titles (*DUAL*). In terms of CEO characteristics, the average (median) tenure of the CEO (*CTEN*) is 9.57 (7.00). Regarding ownership structure, the average (median) percentage of shareholding by the CEO (*COWN*), is 2.85% (1.00%). The average (median) percentage of shares held by block holders (*BOWN*) that own 5% or more of the insurer's stock is 25.86% (21.66%).

With respect to external monitoring, the average (median) number of analysts following is 8.38 (6.42) while an average 93.75% insurers were audited by the big 4 auditors (*AQ*). The average value of shareholders' restrictive right index (*EINDEX*) is 0.297.

Within the insurer control variables reported in Table 3, the average (median) book value of insurer total assets is US\$43.01 (US\$6.81) billion with a minimum of US\$0.16 billion to maximum of US\$1,060.51 billion. The average (median) market capitalization is US\$6.22 (US\$1.46) billion with a minimum of US\$.004 billion to maximum of US\$186.40 billion. The average (median) investment is US\$24.34 (US\$3.87) billion with a minimum of US\$.08 billion to maximum of US\$563.13 billion. The positively skewed distribution of TA, MVE and INV suggests the use of natural logarithmic of TA, MVE and INV in the regression analysis. The average (median) franchise value (*FV*) is 1.11 (1.03) times. The average (median) capital ratio (*CAP*) is 24.62% (24.10%). whilst 18.10% insurers had a merger (*MERGER*) during the year. Turning to the risk measures statistics of Table 3, the average (median) total risk (*TOTR*) is 3.15% (2.40%). The average (median) systematic risk (*SYSR*) is 1.21 (1.06).

The correlation matrix presented in Table 4 indicates no significant multicollinearity among the independent variables as the maximum Pearson pairwise correlation is 0.617

between CEO compensation (*CCOM*) and insurer size (*SIZE*). The variance inflation factor (VIF) also found no sign of potential multicollinearity. This is confirmed by running collinearity tests after each regression. The mean VIF of our three incentives (*BCOM*, *CCOM* and *IOWN*) models are 2.35, 2.45 and 2.18 respectively while none of the independent variables have a VIF greater than 10. Overall, multicollinearity does not appear to be a problem.

[INSERT TABLE 4 ABOUT HERE]

4. Empirical results

Table 5 reports the OLS estimation of equation 2 when total risk (*TOTR*) is chosen as the risk proxy.¹⁵ Column (1) through column (3) reports respectively on the testing of our three hypotheses: H1 (regarding *BCOM*), H2 (about *CCOM*) and H3 (concerning *IOWN*).

[INSERT TABLE 5 ABOUT HERE]

Board compensation (*BCOM*), as predicted, is positively related and statistically significant at the 5 percent level.¹⁶ This suggests that higher levels of stock based compensation for independent directors is related to higher risk taking and therefore supports H1. Table 6, however, shows that similar findings hold for total compensation of independent directors as well.¹⁷ The positive relation between stock based compensation and risk taking is similar to that of Deutsch et al. (2011) between firm risk and option compensation. As

¹⁵ Similar empirical results are found both when including and excluding American International Group (AIG) into our sample. We have reported the results for the sample including AIG, but the other is available upon request. Apart from AIG, where much of its problems arose from noninsurance activity, property–casualty insurers and most life–health insurers have thus far escaped severe adverse consequences from the subprime meltdown and attendant financial crisis (Harrington, 2009).

¹⁶ In an unreported result, we show that board compensation is positively related to accounting based total risk measured with the standard deviation of return on assets over a five year period following Ho et al. (2013).

¹⁷ Total board compensation for each insurer is measured annually as the sum of total compensation paid to all independent directors in the board where total compensation for each independent director comprises of cash, stock awards, option awards, non-equity incentives, change in pension and deferred compensation and all other compensation. When running regression with total compensation, natural logarithm of the total board compensation is used.

reported later in Section 5.3 robustness tests, the composition of stock based compensation (i.e., percentage of stock based compensation to total compensation) of independent directors is also positively related to risk taking and significant at the 10 percent level. So, if the independent directors are compensated more in stocks and options than cash, their interests should become more aligned with the shareholders. This confirms the Ertugrul and Hegde (2008) and Maug (1997) views that stock based compensation encourages independent directors to monitor the risk averse managers to take higher risk. These findings extend on Deutsch et al. (2011) by including the stock based compensation rather than just stock options and also by examining the percentage of stock to total compensation as well as the dollar value of stock based compensation.

[INSERT TABLE 6 ABOUT HERE]

CEO compensation (*CCOM*), as predicted, is positively related and statistically significant at the 1 percent level. This suggests that a higher level of stock based compensation for the CEO is related to higher risk taking and so supports H2. Table 6 also shows that similar findings hold for total compensation of the CEO.¹⁸ As reported later in the robustness test of Section 5.3, the composition of stock based compensation (i.e., percentage of stock based compensation to total compensation) of the CEO is also positively related to risk taking. The interpretation is that if stock based compensation comprises a higher portion of total CEO compensation, their interests are then aligned with the shareholders. So, the stock based compensation provides the CEOs incentives to take higher risk. This positive relation is similar to the Chen et al. (2006), Coles et al. (2006), and Wen and Chen (2008) findings for the relation between CEO option compensation and risk taking. We extend on

¹⁸ Total compensation for the CEO is measured as the sum of salary, bonus, stock awards, option awards, non-equity incentives, change in pension and deferred compensation and all other compensation. When running regression with total compensation, natural logarithm of the CEO's total compensation is used.

their studies by including the stock based compensation and its composition rather than just option compensation.

Due to its influence on compensation structure, institutional ownership was hypothesized to have a positive relation with risk taking. As covered in Section 3.3, quasi-indexers and transient institutional owners do not have similar incentives for monitoring as dedicated ones. As shown in Table 5, dedicated institutional ownership is positively related and statistically significant at the 1 percent level.¹⁹ This suggests that their higher level of dedicated institutional ownership is related to higher risk taking and so supports H3. So, insurers with a higher percentage of dedicated institutional owners should have better external monitoring of risk averse managers. This positive relation is similar to Cheng et al. (2011) institutional investor stability and risk taking in life insurers, but differs in terms of the measurement of institutional ownership and the sample coverage. While they measure the ratio of the average ownership proportion of an institutional investor to the standard deviation of its ownership proportion, Cheng et al. (2011) still use the total institutional ownership and make no distinction amongst the three Bushee (1998) classes. The practical implication of the finding is that not just institutional owners, but rather dedicated institutional owners who exert better monitoring of risk-averse managers.

5. Additional analyses and robustness tests

The results are robust to different model specifications and proxy variables to include pooled OLS regressions models with Driscoll and Kraay standard errors, simultaneous equations, alternative compensation proxy, alternative risk proxies, and board incentives and performance analysis.

¹⁹ We find no statistically significant relation of risk taking with total institutional ownership (average 71.12%), quasi-indexers (average 45.97%) and transient institutional shareholders (16.11%).

5.1. Pooled OLS regressions models with Driscoll and Kraay standard errors

While robust standard errors are included in the OLS models to correct for heteroskedasticity, this does not address any cross sectional correlations (Hoechle, 2007). So following Deutsch et al. (2011), pooled OLS regressions models with Driscoll and Kraay standard errors are applied since they are robust to the heteroskedasticity, autocorrelation, and cross-sectional dependence (Driscoll and Kraay, 1998; Hausman, 1978; White, 1980). In empirical applications involving combined time series and cross-sectional data, the residuals from different cross-sectional units may be correlated with each other. The presence of such spatial correlations in residuals complicates standard inference procedures since they typically require that the cross-sectional units are independent (Driscoll and Kraay, 1995). The Driscoll and Kraay standard errors appropriately address this issue. As reported in Table 7, *BCOM*, *CCOM* and *IOWN* are significant at the 5 percent level.

[INSERT TABLE 7 ABOUT HERE]

5.2. Simultaneous equations

So far the board incentives (i.e., *BCOM*, *CCOM* and *IOWN*) are examined separately. As discussed in Section 1, *CCOM* and *IOWN* are included as board incentives due to their connections with *BCOM*. Considering their interconnectedness, board compensation (*BCOM*), CEO compensation (*CCOM*) and institutional ownership (*IOWN*) are now included in a single equation to examine whether they work in combination rather than in isolation. As reported in Table 8, the results are qualitatively the same as with separate examination presented in Table 5. Column (1) presents the OLS results whereas Column (2) reports the pooled OLS with Driscoll and Kraay standard errors results.

[INSERT TABLE 8 ABOUT HERE]

The inclusion of these three variables (i.e., *BCOM*, *CCOM* and *IOWN*) in the same equation does not, however, address the endogeneity arising from simultaneity bias. Two additional equations are developed for *BCOM* and *CCOM* to test the simultaneity among *TOTR*, *BCOM* and *CCOM*:

$$\begin{aligned}
BCOM_{i,t} = & \beta_0 + \beta_1(CCOM)_{i,t} + \beta_2(IOWN)_{i,t} \\
& + \beta_3(BIND)_{i,t} + \beta_4(GDIV)_{i,t} + \beta_5(BBUS)_{i,t} + \beta_6(BS)_{i,t} + \beta_7(DUAL)_{i,t} \\
& + \beta_8(BM)_{i,t} + \beta_9(CTEN)_{i,t} + \beta_{10}(COWN)_{i,t} + \beta_{11}(BOWN)_{i,t} \\
& + \beta_{12}(BODOWN)_{i,t} + \beta_{13}(ISIZE)_{i,t} + \beta_{14}(SEGNO)_{i,t} + \beta_{15}(RET)_{i,t-1} \\
& + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t} \tag{3}
\end{aligned}$$

$$\begin{aligned}
CCOM_{i,t} = & \beta_0 + \beta_1(BCOM)_{i,t} + \beta_2(IOWN)_{i,t} \\
& + \beta_3(BIND)_{i,t} + \beta_4(BS)_{i,t} + \beta_5(CTEN)_{i,t} + \beta_6(CAGE)_{i,t} + \beta_7(COWN)_{i,t} \\
& + \beta_8(BOWN)_{i,t} + \beta_9(ISIZE)_{i,t} + \beta_{10}(SEGNO)_{i,t} + \beta_{11}(RET)_{i,t-1} \\
& + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t} \tag{4}
\end{aligned}$$

Total risk (*TOTR*) measures risk taking whilst board compensation (*BCOM*), CEO compensation (*CCOM*) and institutional ownership (*IOWN*) measure incentives. Hence, these variables are included in Equation (2), Equation (3) and Equation (4). Equation (3) regarding board compensation (*BCOM*) is developed following Linck et al. (2009) while Equation (4) regarding CEO compensation (*CCOM*) is formulated following Fahlenbrach (2009) and Chhaochharia and Grinstein (2009).

The variables in Equation (3) and Equation (4) (i.e., compensation determinants) are based on the reputation (Milbourn, 2003), contracting (Jensen and Murphy, 1990), managerial power (Bebchuk et al., 2002), incentive theories (Adams and Ferreira, 2008; Yermack, 2004) and board structure. The reputation theory predicts the relationship between

pay and reputation of directors. The contracting theory predicts relationship between pay and performance, job complexity, leverage and ownership. The managerial-power theory predicts the relation between pay and CEO negotiation power. The incentive theory predicts the relations between pay and board activity. This study includes prior period stock returns (*RET*) for performance, insurer size (*ISIZE*) and number of business segments (*SEGNO*) for firm complexity, CEO tenure (*CTEN*) and CEO age (*CAGE*) to proxy for CEO's bargaining power, CEO ownership (*COWN*) and board ownership (*BODOWN*) to proxy for potential substitution between the incentive-alignment effect provided by a compensation contract and that of an ownership stake, the number of board meetings (*BM*) to proxy for board activity, busy boards (*BBUS*) to proxy for reputation, and board independence (*BIND*) and gender diversity (*GDIV*) are proxy for board composition. Board size (*BS*) and duality CEO-Chairperson duality (*DUAL*) are included to capture the board structure whereas block ownership (*BOWN*) is considered for external monitoring.

As reported in Table 9, even after controlling for simultaneity, board compensation and dedicated institutional ownership are positively related to risk taking and significant at the 5 percent level.

[INSERT TABLE 9 ABOUT HERE]

5.3. Alternative compensation proxy

The OLS results reported in Table 5 includes the dollar value of stock based compensation for independent directors as well as for the CEO. As discussed in Section 3.2, although significantly related, stock based compensation need not comprise a significant portion of total compensation. To address the composition issue, this section presents the board incentives and risk taking results using the composition of compensation (i.e. stock based compensation as a percentage of total compensation) as the incentives following

Ertugrul and Hegde (2008). The results remain qualitatively the same as the dollar stock based compensation and risk taking relationship.

[INSERT TABLE 10 ABOUT HERE]

5.4. *Alternative risk proxies*

While total risk captures the overall risk profile of an insurer, a portion of it (i.e. systematic risk) arises from the variability in equity returns due to changes in the underlying macroeconomic and financial condition (Wen and Chen, 2008). Although the empirical literature focuses on total risk in testing the relation between risk and incentives, systematic risk should also matter due to the scope for managers to alter the systematic component of the total risk via their investment decisions (Jin, 2002). For further robustness, this section reports the risk taking and board incentives results using systematic risk (*SYSR*) discussed in Section 3.1. The results presented are based on the fixed effect (FE) regression with Driscoll and Kraay standard errors. Column (1) of Table 11 includes the level of board compensation while Column (2) considers board compensation composition. As both columns show, board compensation and institutional ownership are positively related and significant at the 1 percent level. CEO compensation is positively related and significant at the 5 percent level.

[INSERT TABLE 11 ABOUT HERE]

Although systematic risk reflects on managerial investment decisions, it may not fully capture the underwriting risk associated with the uncertainty of insurance contract losses. For further robustness, we show that incentives are positively related to underwriting risk (*UR*) measured by percentage change in loss reserve following Ho et al. (2013). So an increase in loss reserve indicates a higher underwriting risk. As shown in Table 12, *BCOM*, *CCOM* and *IOWN* are positively related to underwriting risk and significant at the 1 percent level.

[INSERT TABLE 12 ABOUT HERE]

5.5. Board incentives and performance analysis

Incentives related to risk taking help to alleviate the conflicts between shareholders and managers in terms of their risk preferences. The shareholders have higher risk preference while managers prefer lower risk taking. Differences between shareholders and managers may also impact on performance (Harrington, 1983). Hence board incentives should also be related to insurer performance. As an additional analysis, board incentives and insurance performance is examined to support this link. Performance is measured by Tobin's Q (*TOBINQ*), which is the ratio of market value of assets and book value of assets.²⁰ The results are presented in Table 13.

[INSERT TABLE 13 ABOUT HERE]

As reported in Column (1) of Table 13, board compensation (*BCOM*) is positively related to performance and statistically significant at the 5 percent level. This suggests that equity awards align independent directors' interest with shareholders and reduces the potential conflict (if any) between them. So, a higher level of stock based remuneration of independent directors is related to better insurer performance. We find similar results when measuring board compensation as percentage of stock based compensation to total compensation. This positive relation is similar to Fich and Shivdasani (2005) who find a positive relation between option compensation of outside directors and firm value in non-financial corporations. We extend their study, however, by including the amount of stock based compensation rather than using just a dummy for the option compensation of outside directors. Moreover, we measure the compensation of independent directors, which no prior study has done yet. Independent directors are primarily appointed for monitoring and advising and so stock based compensation provides them incentives by offering ownership (Dey and Liu, 2011). The fact that the independent directors can own shares in other ways

²⁰ The board structure and performance results remain the same when stock return is used as an alternative performance measure. Stock return (*RET*) is measured as the monthly compounded annual stock return following Linck et al. (2009). The stock return is adjusted for dividends and stock splits.

than through their compensation plan is also considered. Their stock based compensation, however, is not significantly related to their prior holdings.

CEO compensation (*CCOM*) is positively related to insurer performance and significant at the 1 percent level as reported in Column (2) of Table 13. This implies that stock based compensation aligns the CEOs interests with shareholders and so a higher level of CEO stock based compensation is related to better performance of insurers. Moreover, the composition of stock based compensation (i.e. percentage of stock based compensation to total compensation) of the CEO is also positively related to performance and significant at the 1 percent level. The interpretation is that if CEOs are awarded with higher stock based compensation and that comprises a higher portion of total compensation, their interests are more aligned with shareholders. So, stock based compensation provides the CEOs incentives to improve performance. Further analysis shows that the positive relation between CEO compensation and performance holds for insurer years where CEO compensation is greater than the sample mean (32.56%). This additional finding suggests that a higher level stock based compensation aligns the interests of CEOs. In term of external monitoring, dedicated institutional ownership is positively related to insurer performance and significant at the 10 percent level. Dedicated institutional owners are the ones who have larger stakes and lower turnover and so are considered more effective external monitors.

6. Conclusions

This study examined whether board incentives are related to risk taking in US listed insurers. More specifically, it investigated whether insurer risk taking increases with stock based compensation of the board, stock based compensation of the CEO compensation and institutional monitoring.

Using a sample of 104 listed US insurers over 2006-2010, we show that board compensation, CEO compensation and institutional ownership are positively related to risk

taking. The results are consistent for both compensation level (i.e., logarithm of stock based compensation) and compensation composition (i.e., percentage of stock based compensation over total compensation). In terms of institutional ownership, dedicated institutional ownership rather than total institutional ownership is significantly related. The results are robust to different model specifications, and alternative compensation and risk proxies.

These findings have several implications for academics, investors and regulators. For academics, our findings should be useful when designing future board incentives research as their variables construction (such as board compensation to include only compensation of independent directors and classification of institutional ownership) have been shown to be important. Investors may find it preferable to select insurers where a higher level of stock based compensation is paid to independent directors and the CEO. Finally, regulators should carefully consider these various incentives aspects to ensure that excessive compensation is not paid to independent directors and the CEO.

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Table 1: Sample selection

Insurer-years covered by Compustat FS format over 2003-2010 ^a		1181
Less: Incorporated outside US ^b		(279)
US incorporated insurer years		902
Less: Insurer- years not found in the Corporate Library ^c	(219)	
Insurer- years having fiscal year ending June	(4)	
Insurers having one year of data	<u>(12)</u>	(235)
Insurer- years covered by both Compustat and the Corporate Library		667
Less: Insurer years over 2003-2005 ^d	(198)	
Insurers having one year of data	<u>(3)</u>	
		(201)

^a Compustat's Financial Services (FS) format rather than Industry (IND) format was chosen as it provides insurance specific company data. It started in 1982, but increased the coverage significantly in 1999.

^b This study considers only US incorporated direct insurers due to the regulatory differences across countries.

^c The Corporate Library, a comprehensive corporate governance database covering 3000 US publicly listed companies, has a wider coverage of insurance companies and so to extend our sample, Compustat insurers are combined with the Corporate Library database.

^d Due to the unavailability of director stock and option compensation in the DEF14A proxy files, 198 insurer-year observations related to 2003-2005 were dropped.

Table 2: Variable description

Notation	Variable Name	Description
Risk measures		
<i>TOTR</i>	Total risk (market based)	Standard deviation of daily stock returns of each stock for each year.
<i>SYSR</i>	Systematic risk	β_{1i} estimated from $R_{it} = \alpha + \beta_{1i}R_{mt} + \beta_{2i}I_{it} + \varepsilon_{it}$
<i>UR</i>	Underwriting risk	Percentage change in loss reserves
Performance measures		
<i>TOBINQ</i>	Tobin's Q	Ratio of market value of assets and book value of assets
<i>RET</i>	Shareholder return	Monthly compounded annual stock return where the stock return is adjusted for stock splits and dividends.
Board incentives		
<i>BCOM</i>	Board stock based compensation	Stock based compensation of all independent directors for each firm for each year.
<i>CCOM</i>	CEO stock based compensation	Stock based compensation of the CEO for each firm for each year.
<i>PBCOM</i>	Board stock based compensation percentage	Percentage of stock based compensation to total compensation of all independent directors for each firm for each year.
<i>PCCOM</i>	CEO stock based compensation percentage	Percentage of stock based compensation to total compensation of the CEO for each firm for each year.
<i>BODTOTAL</i>	Board total compensation	Total compensation of all independent directors for each firm for each year.
<i>CEOTOTAL</i>	CEO total compensation	Total compensation of the CEO for each firm for each year.
<i>IOWN</i>	Institutional ownership	Percentage of shares held by dedicated institutional investors.
Control variables		
<i>BIND</i>	Board independence	The percentage of independent directors on the board.
<i>GDIV</i>	Gender diversity	Proportion of female independent directors amongst all independent directors on the board.
<i>BBUS</i>	Busy boards	Average directorships per independent director.
<i>BS</i>	Board size	Number of all directors.
<i>DUAL</i>	Duality	Dummy variable. One if same person is the CEO and Chairperson; zero otherwise.
<i>BM</i>	Board meetings	Number of board meetings held during a year.
<i>CTEN</i>	CEO tenure	Year under consideration minus CEO hire year.
<i>CAGE</i>	CEO age	Year under consideration minus the year of birth of the CEO
<i>COWN</i>	CEO ownership	Percentage of stock owned by the CEO.
<i>BOWN</i>	Block ownership	Percentage of stock owned by holders of more than 5%.
<i>BODOWN</i>	Board ownership	Percentage of shares held by all independent directors for each firm for each year.
<i>NOAF</i>	Analysts following	Average number of analysts following an insurer in a year.
<i>AQ</i>	Audit quality	One if an insurer was audited by a big 4 auditor; otherwise zero.
<i>EINDEX</i>	Entrenchment index	Sum of staggered board and poison pill provisions. A proxy for G-index.
<i>ISIZE</i>	Insurer size	Total assets (or market capitalization) on the fiscal year end date.
<i>CAP</i>	Capital	Ratio of capital to total assets.
<i>INV</i>	Investments	Total investment in securities and loans.
<i>FV</i>	Franchise value	Tobin's Q following Lindenberg and Ross (1981).
<i>MB</i>	Market to book ratio	Ratio of market value of equity and book value of equity.
<i>SEGNO</i>	Number of segments	Number of business segments of an insurer for each year.
<i>MERGER</i>	Merger	One if there was any merger during the fiscal year; zero otherwise.
<i>ITYPE</i>	Insurance type	One for a life and health insurer; zero otherwise.
<i>CRISIS</i>	Crisis	One for the years 2007 through 2010; zero otherwise.
<i>YEAR</i>	Year dummies	Individual dummy variables which equals either one or zero for each year from 2004 to 2010 with 2003 being excluded.

Table 3: Descriptive statistics

This table presents the distribution of each variable by showing mean, standard deviation (SD), minimum (Min.), first quartile (1st Quartile), median (Median), third quartile (3rd Quartile), maximum (Max.), skewness (Skew.), and kurtosis (Kurt.). Please refer to Table 2 for the definition of each variable.

Variables	Mean	SD	Min	1st Quartile	Median	3rd quartile	Max	Skewness	Kurtosis
Risk									
<i>TOTR (%)</i>	3.154	2.288	0.885	1.671	2.400	3.905	12.335	2.088	7.792
<i>SYSR</i>	1.215	0.559	0.260	0.858	1.066	1.422	3.125	1.492	5.422
<i>UR (%)</i>	1.504	3.805	0.291	2.213	5.638	9.612	287.686	4.993	29.962
Performance									
<i>TOBIN Q</i>	1.108	0.362	0.689	0.978	1.029	1.126	5.001	6.314	53.343
<i>RET</i>	0.031	0.390	-0.971	-0.146	0.027	0.199	3.011	1.448	12.991
Board incentives									
<i>BCOM</i> (mil. US\$)	0.561	0.598	0.000	0.118	0.400	0.900	3.865	2.051	9.732
<i>CCOM</i> (mil. US\$)	2.335	3.182	0.000	0.202	1.057	3.042	15.932	1.978	6.803
<i>PBCOM</i>	0.390	0.244	0.000	0.259	0.429	0.542	1.000	-0.067	2.535
<i>PCCOM</i>	0.326	0.237	0.000	0.120	0.332	0.500	0.859	0.165	2.031
<i>BODTOTAL</i> (mil. US\$)	1.162	0.881	0.000	0.490	0.992	1.643	4.960	1.449	6.239
<i>CEOTOTAL</i> (mil. US\$)	5.463	5.727	0.423	11.648	3.269	6.764	26.364	1.855	5.936
<i>IOWN</i>	0.087	0.136	0.000	0.011	0.052	0.102	0.906	3.766	19.500
Board structure									
<i>BIND</i>	0.714	0.146	0.071	0.600	0.739	0.833	1.000	-0.580	3.030
<i>GDIV</i>	0.135	0.122	0.000	0.000	0.125	0.200	0.500	0.483	2.324
<i>BBUS</i>	1.798	0.739	1.000	1.250	1.613	2.200	5.400	1.298	4.935
<i>EBOD</i>	7.684	4.057	0.000	4.916	7.100	9.556	30.286	1.682	8.154
Board characteristics									
<i>BS</i>	10.409	2.476	4.000	9.000	10.000	12.000	18.000	0.335	3.080
<i>DUAL</i>	0.513	0.500	0.000	0.000	1.000	1.000	1.000	-0.052	1.003
<i>BM</i>	8.422	4.741	3.000	5.000	7.000	10.000	34.000	2.138	9.319

Table 3: Descriptive statistics (continued)

Variables	Mean	SD	Min	1st Quartile	Median	3rd quartile	Max	Skewness	Kurtosis
CEO characteristics									
<i>CTEN</i>	9.565	8.776	0.000	3.000	7.000	12.000	41.000	1.573	5.238
Ownership structure									
<i>COWN</i>	0.029	0.058	0.000	0.004	0.010	0.024	0.345	3.940	19.294
<i>BOWN</i>	0.259	0.217	0.000	0.108	0.199	0.352	0.954	1.125	3.599
<i>DOWN</i>	0.010	0.045	0.000	0.001	0.003	0.006	0.655	10.657	128.633
Restrictive provisions									
<i>EINDEX</i>	0.297	0.485	0.000	0.000	0.000	1.000	2.000	1.223	3.272
External monitoring									
<i>AQ</i>	0.938	0.242	0.000	1.000	1.000	1.000	1.000	-3.615	14.067
<i>NOAF</i>	8.383	6.052	1.000	3.667	6.417	12.917	26.500	0.792	2.559
Insurer controls									
<i>TA</i> (bil. US\$)	43.010	123.155	0.158	1.570	6.182	25.685	1060.505	5.212	33.821
<i>MVE</i> (bil. US\$)	6.219	14.602	0.004	0.564	1.460	4.890	186.402	6.987	72.549
<i>CAP</i>	0.246	0.146	-0.628	0.139	0.241	0.342	0.695	-0.145	5.500
<i>INV</i>	24.341	69.131	0.081	1.028	3.866	14.149	563.131	5.151	31.985
<i>SEGNO</i>	1.405	0.817	0.000	1.000	1.732	2.000	3.162	-0.443	2.265
<i>MB</i>	2.507	23.348	-0.104	0.853	1.151	1.521	501.117	21.159	452.188
<i>MERGER</i>	0.181	0.385	0.000	0.000	0.000	0.000	1.000	1.657	3.745
<i>VOL</i> (<i>t-1</i>)	0.030	0.023	0.007	0.015	0.023	0.037	0.150	2.318	9.502
<i>RET</i> (<i>t-1</i>)	0.017	0.372	-0.971	-0.146	0.018	0.207	3.011	1.233	13.148

Table 4: Correlation matrix

This table shows Pearson pairs-wise sample correlations. Bold text indicates statistically significant at 1% level or better. See Table 2 for variable definitions.

	<i>TOTR</i>	<i>SYSR</i>	<i>UR</i>	<i>BCOM</i>	<i>CCOM</i>	<i>IOWN</i>	<i>BIND</i>	<i>BS</i>	<i>DUAL</i>	<i>CTEN</i>	<i>COWN</i>	<i>BOWN</i>	<i>EINDEX</i>	<i>ISIZE</i>	<i>INV</i>	<i>CAP</i>	<i>MB</i>	<i>MERGER</i>	<i>AQ</i>
<i>TOTR</i>	1.000																		
<i>SYSR</i>	0.709	1.000																	
<i>UR</i>	0.250	0.321	1.000																
<i>BCOM</i>	-0.035	-0.038	-0.033	1.000															
<i>CCOM</i>	-0.073	-0.060	-0.048	0.616	1.000														
<i>IOWN</i>	0.054	0.046	-0.028	-0.091	-0.019	1.000													
<i>BIND</i>	0.083	0.088	0.036	0.461	0.358	-0.213	1.000												
<i>BS</i>	0.006	0.160	0.042	0.365	0.325	-0.232	0.062	1.000											
<i>DUAL</i>	0.007	0.045	-0.033	0.128	0.178	0.013	0.053	0.033	1.000										
<i>CTEN</i>	-0.134	-0.116	-0.070	-0.192	-0.135	-0.027	-0.253	-0.037	0.318	1.000									
<i>COWN</i>	-0.059	-0.049	0.034	-0.206	-0.165	0.007	-0.313	-0.101	0.247	0.422	1.000								
<i>BOWN</i>	0.119	0.038	-0.045	-0.242	-0.213	0.333	-0.087	-0.244	-0.128	-0.069	-0.116	1.000							
<i>EINDEX</i>	0.024	0.082	0.093	0.246	0.179	-0.076	0.265	0.223	0.029	-0.090	-0.040	-0.153	1.000						
<i>SIZE</i>	0.076	0.221	0.146	0.482	0.617	-0.010	0.294	0.482	0.079	-0.150	-0.194	-0.204	0.211	1.000					
<i>INV</i>	0.057	0.245	0.153	0.394	0.566	0.012	0.235	0.452	0.089	-0.070	-0.169	-0.181	0.165	0.970	1.000				
<i>CAP</i>	-0.364	-0.410	-0.313	0.008	-0.149	0.030	-0.105	-0.129	-0.009	0.034	-0.019	0.054	-0.074	-0.504	-0.568	1.000			
<i>MB</i>	0.134	0.044	-0.017	-0.032	-0.011	-0.024	0.030	0.020	0.054	-0.015	-0.017	0.115	-0.033	0.105	0.116	-0.077	1.000		
<i>MERGER</i>	-0.100	-0.167	-0.094	0.061	0.045	0.008	0.033	-0.085	0.010	0.004	0.026	-0.082	0.127	-0.017	-0.074	0.041	-0.021	1.000	
<i>AQ</i>	0.006	-0.026	-0.081	0.175	0.167	0.036	0.098	0.268	-0.002	-0.105	-0.170	0.062	0.011	0.254	0.180	0.065	-0.017	-0.017	1.000

Table 5: OLS results of the board incentives (stock based compensation) and total risk

This table reports the ordinary least square (OLS) estimation of equation (2):

$$Risk_{i,t} = \beta_0 + \beta_1(Board\ incentives)_{i,t} + \beta_2(BIND)_{i,t} + \beta_3(BS)_{i,t} + \beta_4(DUAL)_{i,t} + \beta_5(CTEN)_{i,t} + \beta_6(COWN)_{i,t} + \beta_7(BOWN)_{i,t} + \beta_8(EINDEX)_{i,t} + \beta_9(ISIZE)_{i,t} + \beta_{10}(INV)_{i,t} + \beta_{11}(CAP)_{i,t} + \beta_{12}(MB)_{i,t} + \beta_{13}(AQ)_{i,t} + \beta_{14}(MERGER)_{i,t} + \beta_{15}(ITYPE)_{i,t} + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t}$$

The dependent variable risk is the total risk (*TOTR*). *TOTR* = Total risk measured by the yearly standard deviation of the daily stock returns, *BCOM* = Natural logarithm of board stock based compensation computed as the total stock and option compensation of all independent directors in a board, *CCOM* = Natural logarithm of CEO's stock based compensation calculated as the total of stock and option compensation, *IOWN* = Institutional ownership computed as the percentage of shares held by dedicated institutional owners, *BIND* = Proportion of independent directors in the board, *BS* = Natural logarithm of total board members, *DUAL* = 1 if a CEO is also the Chairperson of the board, *CTEN* = CEO tenure measured as the natural logarithm of the number of years a CEO has been working as a CEO, *COWN* = Percentage of shares held by the CEO, *BOWN* = Block ownership measured as the total percentage of shares held by unaffiliated block holders holding 5% or more shares, *EINDEX* = Proxy for entrenchment index, which is a sum of two dummy variables, staggered board and poison pill, *ISIZE* = Insurer size measured as the natural logarithm of total assets, *INV* = Natural logarithm of total investment in securities and loans, *CAP* = Capital measured as the ratio of equity to total assets, *MB* = Market to book ratio computed as the ratio of market value of equity to book value of equity, *MERGER* = 1 if there was any merger during the fiscal year; otherwise 0, *AQ* = 1 if a firm was audited by a big 4 accounting firm; otherwise 0, *ITYPE* = 1 for a life and health insurer; otherwise 0. Superscripts ***, **, * represent significance levels at 1%, 5% and 10% respectively. Numbers in parentheses are t-statistics.

	(1)	(2)	(3)
PANEL A: Coefficients estimation			
Board incentives			
<i>BCOM</i>	0.001** (2.324)		
<i>CCOM</i>		0.005*** (3.335)	
<i>IOWN</i>			0.015*** (2.935)
Control variables			
<i>BIND</i>	0.006 (1.305)	0.006 (1.314)	0.015*** (2.918)
<i>BS</i>	0.001 (0.243)	0.001 (0.384)	0.004 (1.194)
<i>DUAL</i>	0.002 (1.555)	0.002 (1.283)	0.002 (1.408)
<i>CTEN</i>	-0.001* (-1.869)	-0.001 (-1.398)	-0.001* (-1.750)
<i>COWN</i>	-0.024*** (-2.498)	-0.026*** (-2.651)	-0.027*** (-2.867)
<i>BOWN</i>	0.006 (1.583)	0.004 (1.275)	0.002 (0.475)
<i>EINDEX</i>	0.000 (0.203)	-0.000 (-0.152)	0.000 (0.040)
<i>ISIZE</i>	-0.011*** (-6.511)	-0.012*** (-6.997)	-0.010*** (-6.341)
<i>INV</i>	0.007*** (4.223)	0.007*** (4.215)	0.006*** (3.978)
<i>CAP</i>	-0.005 (-0.463)	-0.004 (-0.413)	-0.008 (-0.678)
<i>MB</i>	0.001*** (12.915)	0.001*** (12.860)	0.001*** (12.538)
<i>MERGER</i>	0.004* (1.658)	0.005* (1.683)	0.005** (1.981)
<i>AQ</i>	0.004* (1.841)	0.004* (1.741)	0.004* (1.702)
<i>Constant</i>	0.028*** (3.019)	0.036*** (3.617)	0.020*** (2.063)
<i>ITYPE</i>	Yes	Yes	Yes
<i>YEAR</i>	Yes	Yes	Yes
PANEL B: Model fit			
<i>N</i>	450	450	450
<i>Adj. R²</i>	0.632	0.637	0.633
<i>F</i>	717.588***	791.278***	739.443***

Table 6: OLS results of the board incentives (total compensation) and total risk

This table reports the ordinary least square (OLS) estimation of equation (2):

$$Risk_{i,t} = \beta_0 + \beta_1(Board\ incentives)_{i,t} + \beta_2(BIND)_{i,t} + \beta_3(BS)_{i,t} + \beta_4(DUAL)_{i,t} + \beta_5(CTEN)_{i,t} + \beta_6(COWN)_{i,t} + \beta_7(BOWN)_{i,t} + \beta_8(EINDEX)_{i,t} + \beta_9(ISIZE)_{i,t} + \beta_{10}(INV)_{i,t} + \beta_{11}(CAP)_{i,t} + \beta_{12}(MB)_{i,t} + \beta_{13}(AQ)_{i,t} + \beta_{14}(MERGER)_{i,t} + \beta_{15}(ITYPE)_{i,t} + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t}$$

The dependent variable risk is the total risk (*TOTR*). *TOTR* = Total risk measured by the yearly standard deviation of the daily stock returns, *BODTOTAL* = Natural logarithm of total compensation all independent directors in a board, *CEOTOTAL* = Natural logarithm of CEO's total compensation, *IOWN* = Institutional ownership computed as the percentage of shares held by dedicated institutional owners, *BIND* = Proportion of independent directors in the board, *BS* = Natural logarithm of total board members, *DUAL* = 1 if a CEO is also the Chairperson of the board, *CTEN* = CEO tenure measured as the natural logarithm of the number of years a CEO has been working as a CEO, *COWN* = Percentage of shares held by the CEO, *BOWN* = Block ownership measured as the total percentage of shares held by unaffiliated block holders holding 5% or more shares, *EINDEX* = Proxy for entrenchment index, which is a sum of two dummy variables, staggered board and poison pill, *ISIZE* = Insurer size measured as the natural logarithm of total assets, *INV* = Natural logarithm of total investment in securities and loans, *CAP* = Capital measured as the ratio of equity to total assets, *MB* = Market to book ratio computed as the ratio of market value of equity to book value of equity, *MERGER* = 1 if there was any merger during the fiscal year; otherwise 0, *AQ* = 1 if a firm was audited by a big 4 accounting firm; otherwise 0, *ITYPE* = 1 for a life and health insurer; otherwise 0. Superscripts ***, **, * represent significance levels at 1%, 5% and 10% respectively. Numbers in parentheses are t-statistics.

	(1)	(2)
PANEL A: Coefficients estimation		
Board incentives		
<i>BODTOTAL</i>	0.002** (2.033)	
<i>CEOTOTAL</i>		0.003*** (3.005)
Control variables		
<i>BIND</i>	0.007 (1.162)	0.008 (1.423)
<i>BS</i>	0.005 (1.419)	0.006* (1.820)
<i>DUAL</i>	0.004*** (2.619)	0.003** (2.150)
<i>CTEN</i>	-0.000** (-2.045)	-0.000** (-2.027)
<i>COWN</i>	-0.018 (-1.246)	-0.025* (-1.708)
<i>BOWN</i>	0.009*** (2.705)	0.008** (2.414)
<i>EINDEX</i>	0.001 (0.415)	0.000 (0.125)
<i>ISIZE</i>	-0.005*** (-8.672)	-0.006*** (-8.326)
<i>CAP</i>	-0.052*** (-10.412)	-0.049*** (-9.770)
<i>FV</i>	0.006** (2.440)	0.003 (1.602)
<i>MERGER</i>	0.002 (0.545)	0.002 (0.640)
<i>AQ</i>	0.008** (2.539)	0.008** (2.451)
<i>Constant</i>	0.022** (2.166)	0.014 (1.239)
<i>ITYPE</i>	Yes	Yes
<i>YEAR</i>	Yes	Yes
PANEL B: Model fit		
<i>N</i>	456	456
<i>Adj. R²</i>	0.590	0.594
<i>F</i>	37.313***	37.996***

Table 7: Pooled OLS with Driscoll and Kraay standard errors results for board incentives and risk taking

This table reports the ordinary least square (OLS) estimation of equation (2):

$$Risk_{i,t} = \beta_0 + \beta_1(Board\ incentives)_{i,t} + \beta_2(BIND)_{i,t} + \beta_3(BS)_{i,t} + \beta_4(DUAL)_{i,t} + \beta_5(CTEN)_{i,t} + \beta_6(COWN)_{i,t} + \beta_7(BOWN)_{i,t} + \beta_8(EINDEX)_{i,t} + \beta_9(ISIZE)_{i,t} + \beta_{10}(INV)_{i,t} + \beta_{11}(CAP)_{i,t} + \beta_{12}(MB)_{i,t} + \beta_{13}(AQ)_{i,t} + \beta_{14}(MERGER)_{i,t} + \beta_{15}(ITYPE)_{i,t} + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t}$$

The dependent variable risk is the total risk (*TOTR*). *TOTR* = Total risk measured by the yearly standard deviation of the daily stock returns, *BCOM* = Natural logarithm of board stock based compensation computed as the total stock and option compensation of all independent directors in a board, *CCOM* = Natural logarithm of CEO's stock based compensation calculated as the total of stock and option compensation, *IOWN* = Institutional ownership computed as the percentage of shares held by dedicated institutional owners, *BIND* = Proportion of independent directors in the board, *BS* = Natural logarithm of total board members, *DUAL* = 1 if a CEO is also the Chairperson of the board, *CTEN* = CEO tenure measured as the natural logarithm of the number of years a CEO has been working as a CEO, *COWN* = Percentage of shares held by the CEO, *BOWN* = Block ownership measured as the total percentage of shares held by unaffiliated block holders holding 5% or more shares, *EINDEX* = Proxy for entrenchment index, which is a sum of two dummy variables, staggered board and poison pill, *ISIZE* = Insurer size measured as the natural logarithm of total assets, *INV* = Natural logarithm of total investment in securities and loans, *CAP* = Capital measured as the ratio of equity to total assets, *MB* = Market to book ratio computed as the ratio of market value of equity to book value of equity, *MERGER* = 1 if there was any merger during the fiscal year; otherwise 0, *AQ* = 1 if a firm was audited by a big 4 accounting firm; otherwise 0, *ITYPE* = 1 for a life and health insurer; otherwise 0. Superscripts ***, **, * represent significance levels at 1%, 5% and 10% respectively. Numbers in parentheses are t-statistics.

	(1)	(2)	(3)
PANEL A: Coefficients estimation			
Board incentives			
<i>BCOM</i>	0.001** (3.772)		
<i>CCOM</i>		0.005** (4.740)	
<i>IOWN</i>			0.015** (4.390)
Control variables			
<i>BIND</i>	0.006 (1.622)	0.006 (1.907)	0.015** (3.651)
<i>BS</i>	0.001 (0.698)	0.001 (0.988)	0.004* (2.694)
<i>DUAL</i>	0.002** (3.597)	0.002* (2.955)	0.002* (2.477)
<i>CTEN</i>	-0.001 (-1.330)	-0.001 (-0.888)	-0.001 (-1.169)
<i>COWN</i>	-0.024** (-4.022)	-0.026** (-5.172)	-0.027*** (-5.412)
<i>BOWN</i>	0.006* (2.624)	0.004* (2.783)	0.002 (0.819)
<i>EINDEX</i>	0.000 (0.267)	-0.000 (-0.151)	0.000 (0.054)
<i>ISIZE</i>	-0.011** (-4.264)	-0.012** (-5.234)	-0.010** (-4.499)
<i>INV</i>	0.007* (2.723)	0.007* (2.794)	0.006* (2.715)
<i>CAP</i>	-0.005 (-0.673)	-0.004 (-0.511)	-0.008 (-0.920)
<i>MB</i>	0.001*** (8.011)	0.001*** (8.318)	0.001*** (7.600)
<i>MERGER</i>	0.004 (1.787)	0.005 (1.820)	0.005 (2.296)
<i>AQ</i>	0.004 (2.320)	0.004 (1.701)	0.004 (1.756)
<i>Constant</i>	0.028*** (5.719)	0.036*** (7.050)	0.020*** (3.205)
<i>ITYPE</i>	Yes	Yes	Yes
<i>YEAR</i>	Yes	Yes	Yes
PANEL B: Model fit			
<i>N</i>	450	450	450
<i>R</i> ²	0.647	0.653	0.649
<i>F</i>	121.432***	19.975***	23.589***

Table 8: OLS results of the board incentives (single equation) and total risk

This table reports the OLS estimation of equation (2) when including *BCOM*, *CCOM* and *IOWN* in the same equation:

The dependent variable risk is the total risk (*TOTR*). *TOTR* = Total risk measured by the yearly standard deviation of the daily stock returns, *BCOM* = Natural logarithm of board stock based compensation computed as the total stock and option compensation of all independent directors in a board, *CCOM* = Natural logarithm of CEO's stock based compensation calculated as the total of stock and option compensation, *IOWN* = Institutional ownership computed as the percentage of shares held by dedicated institutional owners, *BIND* = Proportion of independent directors in the board, *BS* = Natural logarithm of total board members, *DUAL* = 1 if a CEO is also the Chairperson of the board, *CTEN* = CEO tenure measured as the natural logarithm of the number of years a CEO has been working as a CEO, *COWN* = Percentage of shares held by the CEO, *BOWN* = Block ownership measured as the total percentage of shares held by unaffiliated block holders holding 5% or more shares, *EINDEX* = Proxy for entrenchment index, which is a sum of two dummy variables, staggered board and poison pill, *ISIZE* = Insurer size measured as the natural logarithm of total assets, *INV* = Natural logarithm of total investment in securities and loans, *CAP* = Capital measured as the ratio of equity to total assets, *MB* = Market to book ratio computed as the ratio of market value of equity to book value of equity, *MERGER* = 1 if there was any merger during the fiscal year; otherwise 0, *AQ* = 1 if a firm was audited by a big 4 accounting firm; otherwise 0, *ITYPE* = 1 for a life and health insurer; otherwise 0. Superscripts ***, **, * represent significance levels at 1%, 5% and 10% respectively. Numbers in parentheses are t-statistics.

	(1)	(2)
PANEL A: Coefficients estimation		
<i>Board incentives</i>		
<i>BCOM</i>	0.001* (1.936)	0.001* (2.698)
<i>CCOM</i>	0.004*** (2.639)	0.004** (3.264)
<i>IOWN</i>	0.017*** (3.120)	0.017** (4.829)
<i>Control variables</i>		
<i>BIND</i>	0.007 (1.509)	0.007 (1.985)
<i>BS</i>	0.003 (1.070)	0.003* (2.453)
<i>DUAL</i>	0.002 (1.022)	0.002 (2.180)
<i>CTEN (x1000)</i>	-0.054 (-0.834)	-0.054 (-0.545)
<i>COWN</i>	-0.024** (-2.320)	-0.024*** (-6.492)
<i>BOWN</i>	0.002 (0.501)	0.002 (0.842)
<i>EINDEX</i>	-0.000 (-0.314)	-0.000 (-0.295)
<i>ISIZE</i>	-0.012*** (-7.403)	-0.012*** (-5.492)
<i>INV</i>	0.007*** (4.400)	0.007* (2.883)
<i>CAP</i>	-0.003 (-0.313)	-0.003 (-0.385)
<i>MB (x1000)</i>	0.118*** (13.289)	0.118*** (8.556)
<i>MERGER</i>	0.005* (1.722)	0.005 (2.111)
<i>AQ</i>	0.003 (1.237)	0.003 (1.263)
<i>Constant</i>	0.031*** (2.973)	0.031** (4.771)
<i>ITYPE</i>	Yes	Yes
<i>YEAR</i>	Yes	Yes
PANEL B: Model fit		
<i>N</i>	450	450
<i>R</i> ²	0.661	0.661
<i>F</i>	702.329***	23.499***

Table 9: 3SLS estimation of total risk, board compensation and CEO compensation

This table reports the three-stage least square (3SLS) estimation of the following set of three equations on total risk, board compensation and CEO compensation.

$$\begin{aligned}
 Risk_{i,t} &= \beta_0 + \beta_1(BCOM)_{i,t} + \beta_2(CCOM)_{i,t} + \beta_3(IOWN)_{i,t} + \beta_4(BIND)_{i,t} + \beta_5(BS)_{i,t} + \beta_6(DUAL)_{i,t} + \beta_7(CTEN)_{i,t} + \beta_8(COWN)_{i,t} \\
 &\quad + \beta_9(BOWN)_{i,t} + \beta_{10}(EINDEX)_{i,t} + \beta_{11}(ISIZE)_{i,t} + \beta_{12}(INV)_{i,t} + \beta_{13}(CAP)_{i,t} + \beta_{14}(MB)_{i,t} + \beta_{15}(AQ)_{i,t} \\
 &\quad + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t} \\
 BCOM_{i,t} &= \beta_0 + \beta_1(CCOM)_{i,t} + \beta_2(IOWN)_{i,t} + \beta_3(BIND)_{i,t} + \beta_4(GDIV)_{i,t} + \beta_5(BBUS)_{i,t} + \beta_6(BS)_{i,t} + \beta_7(DUAL)_{i,t} \\
 &\quad + \beta_8(BM)_{i,t} + \beta_9(CTEN)_{i,t} + \beta_{10}(COWN)_{i,t} + \beta_{11}(BOWN)_{i,t} + \beta_{12}(BODOWN)_{i,t} + \beta_{13}(ISIZE)_{i,t} \\
 &\quad + \beta_{14}(SEGNO)_{i,t} + \beta_{15}(RET)_{i,t-1} + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t} \\
 CCOM_{i,t} &= \beta_0 + \beta_1(BCOM)_{i,t} + \beta_2(IOWN)_{i,t} + \beta_3(BIND)_{i,t} + \beta_4(BS)_{i,t} + \beta_6(CTEN)_{i,t} + \beta_7(CAGE)_{i,t} + \beta_8(COWN)_{i,t} + \beta_9(BOWN)_{i,t} \\
 &\quad + \beta_{10}(ISIZE)_{i,t} + \beta_{11}(SEGNO)_{i,t} + \beta_{12}(RET)_{i,t-1} + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t}
 \end{aligned}$$

TOTR = Total risk measured by the yearly standard deviation of the daily stock returns, *BCOM* = Natural logarithm of board stock based compensation computed as the total stock and option compensation of all independent directors in a board, *CCOM* = Natural logarithm of CEO's stock based compensation calculated as the total of stock and option compensation, *IOWN* = Institutional ownership computed as the percentage of shares held by dedicated institutional owners, *BIND* = Proportion of independent directors in the board, *GDIV* = Percentage of females amongst independent directors, *BBUS* = Average number of directorships per independent directors, *BS* = Natural logarithm of total board members, *DUAL* = 1 if a CEO is also the Chairperson of the board, *BM* = Natural logarithm of the number of board meetings, *CTEN* = CEO tenure measured as the natural logarithm of the number of years a CEO has been working as a CEO, *CAGE* = Natural log of the CEO's age, *COWN* = Percentage of shares held by the CEO, *BOWN* = Block ownership measured as the total percentage of shares held by unaffiliated block holders holding 5% or more shares, *BODOWN* = Board ownership measured as the total percentage of shares held by all independent directors of an insurer, *EINDEX* = Proxy for entrenchment index, which is a sum of two dummy variables, staggered board and poison pill, *ISIZE* = Insurer size measured as the natural logarithm of total assets, *INV* = Natural logarithm of total investment in securities and loans, *CAP* = Capital measured as the ratio of equity to total assets, *MB* = Market to book ratio computed as the ratio of market value of equity to book value of equity, *SEGNO* = Natural logarithm of number of business segments of an insurer, *RET*(*t-1*) = Prior period annual stock return. Superscripts ***, **, * represent significance levels at 1%, 5% and 10% respectively. Numbers in parentheses are standard errors.

VARIABLES	(1) <i>TOTR</i>	(2) <i>BCOM</i>	(3) <i>CCOM</i>
PANEL A: Coefficients estimation			
<i>Board incentives</i>			
<i>BCOM</i>	0.008** (2.103)		0.156*** (3.848)
<i>CCOM</i>	0.019 (1.059)	1.772* (1.843)	
<i>IOWN</i>	0.040** (2.470)	-3.212*** (-4.033)	0.633*** (2.622)
<i>Control variables</i>			
<i>BIND</i>	-0.046*** (-3.118)	2.153* (1.679)	0.485* (1.709)
<i>GDIV</i>		0.956 (0.968)	
<i>BBUS</i>		0.227 (1.133)	
<i>BS</i>	-0.000 (-0.004)	-0.195 (-0.395)	0.136 (1.104)
<i>DUAL</i>	-0.002 (-0.767)	0.062 (0.271)	0.068 (1.184)
<i>BM</i>		0.042* (1.748)	
<i>CTEN</i>	0.000 (1.590)	-0.001 (-0.046)	-0.006 (-1.570)
<i>CAGE</i>			-0.078 (-0.344)
<i>COWN</i>	0.034 (1.304)	-3.417* (-1.747)	0.314 (0.574)
<i>BOWN</i>	0.004 (0.654)	-0.948* (-1.955)	0.152 (1.140)

Table 9: 3SLS estimation of total risk, board compensation and CEO compensation (*continued*)

VARIABLES	(1) <i>TOTR</i>	(2) <i>BCOM</i>	(3) <i>CCOM</i>
<i>BODOWN</i>		0.888 (0.357)	
<i>EINDEX</i>	-0.003 (-0.978)		
<i>INV</i>	0.011*** (4.501)		
<i>CAP</i>	0.022 (1.531)		
<i>MB</i>	0.000*** (3.446)		
<i>ISIZE</i>	-0.024*** (-6.095)	-0.095 (-0.347)	0.224*** (7.617)
<i>SEGNO</i>		0.217* (1.757)	-0.074** (-2.408)
<i>RET(t-1)</i>		0.264 (0.899)	-0.059 (-0.750)
<i>Constant</i>	0.079** (2.059)	2.180 (0.780)	-1.890** (-2.020)
<i>YEAR</i>	Yes	Yes	Yes
PANEL B: Model fit			
<i>N</i>	447	447	447
<i>R²</i>	0.067	0.428	0.574
<i>F</i>	17.853***	17.051***	38.574***

Table 10: OLS results of the board incentive composition and total risk

This table reports the ordinary least square (OLS) estimation of equation (2):

$$Risk_{i,t} = \beta_0 + \beta_1(Board\ incentives)_{i,t} + \beta_2(BIND)_{i,t} + \beta_3(BS)_{i,t} + \beta_4(DUAL)_{i,t} + \beta_5(CTEN)_{i,t} + \beta_6(COWN)_{i,t} + \beta_7(BOWN)_{i,t} + \beta_8(EINDEX)_{i,t} + \beta_9(ISIZE)_{i,t} + \beta_{10}(INV)_{i,t} + \beta_{11}(CAP)_{i,t} + \beta_{12}(MB)_{i,t} + \beta_{13}(AQ)_{i,t} + \beta_{14}(MERGER)_{i,t} + \beta_{15}(ITYPE)_{i,t} + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t}$$

Risk measure is *TOTR* whereas board incentives include *PBCOM*, *PCCOM* and *IOWN*. *TOTR* = Total risk measured by the yearly standard deviation of the daily stock returns, *PBCOM* = Percentage of board stock based compensation over total compensation, *PCCOM* = Percentage of CEO's stock based compensation over total compensation, *IOWN* = Institutional ownership computed as the percentage of shares held by dedicated institutional owners, *BIND* = Proportion of independent directors in the board, *BS* = Natural logarithm of total board members, *DUAL* = 1 if a CEO is also the Chairperson of the board, *CTEN* = CEO tenure measured as the natural logarithm of the number of years a CEO has been working as a CEO, *COWN* = Percentage of shares held by the CEO, *BO* = Block ownership measured as the total percentage of shares held by unaffiliated block holders holding 5% or more shares, *EINDEX* = Proxy for entrenchment index, which is a sum of two dummy variables, staggered board and poison pill, *ISIZE* = Insurer size measured as the natural logarithm of total assets, *INV* = Natural logarithm of total investment in securities and loans, *CAP* = Capital measured as the ratio of equity to total assets, *MB* = Market to book ratio computed as the ratio of market value of equity to book value of equity, *MERGER* = 1 if there was any merger during the fiscal year; otherwise 0, *BIG4* = 1 if a firm was audited by a big 4 accounting firm; otherwise 0, *ITYPE* = 1 for a life and health insurer; otherwise 0. Superscripts ***, **, * represent significance levels at 1%, 5% and 10% respectively. Numbers in parentheses are t-statistic.

	(1)	(2)	(3)
PANEL A: Coefficients estimation			
Board incentives			
<i>PBCOM</i>	0.005* (1.688)		
<i>PCCOM</i>		0.010*** (2.634)	
<i>IOWN</i>			0.015*** (2.935)
Control variables			
<i>BIND</i>	0.008* (1.747)	0.007 (1.504)	0.015*** (2.918)
<i>BS</i>	0.002 (0.517)	0.001 (0.337)	0.004 (1.194)
<i>DUAL</i>	0.002 (1.335)	0.003* (1.729)	0.002 (1.408)
<i>CTEN</i>	-0.001* (-1.869)	-0.001 (-1.394)	-0.001* (-1.750)
<i>COWN</i>	-0.024*** (-2.640)	-0.025*** (-2.658)	-0.027*** (-2.867)
<i>BOWN</i>	0.005 (1.541)	0.004 (1.164)	0.002 (0.475)
<i>EINDEX</i>	0.001 (0.478)	-0.000 (-0.024)	0.000 (0.040)
<i>ISIZE</i>	-0.010*** (-6.020)	-0.011*** (-6.621)	-0.010*** (-6.341)
<i>INV</i>	0.006*** (3.877)	0.007*** (4.178)	0.006*** (3.978)
<i>CAP</i>	-0.009 (-0.799)	-0.006 (-0.526)	-0.008 (-0.678)
<i>MB</i>	0.001*** (12.765)	0.001*** (12.453)	0.001*** (12.538)
<i>MERGER</i>	0.004 (1.615)	0.004 (1.612)	0.005** (1.981)
<i>AQ</i>	0.004* (1.855)	0.004 (1.634)	0.004* (1.702)
<i>Constant</i>	0.028*** (2.965)	0.030*** (3.130)	0.020** (2.063)
<i>ITYPE</i>	Yes	Yes	Yes
<i>YEAR</i>	Yes	Yes	Yes
PANEL B: Model fit			
<i>N</i>	448	450	450
<i>Adj. R²</i>	0.625	0.635	0.633
<i>F</i>	819.137***	788.708***	739.443***

Table 11: FE regression with Driscoll and Kraay standard errors results for board incentives and systematic risk

This table presents the FE with Driscoll and Kraay standard errors regression results of *SYSR* and board incentives. Board incentives include *BCOM*, *PBCOM*, *CCOM*, *PCOM* and *IOWN*. Column (1) reports the results when board and CEO compensation are measured as the dollar value of stock based compensation while Column (2) reports the results when board and CEO compensation are measured as the percentage of stock based compensation.

SYSR = Systematic risk measured using the two factor model, *BCOM* = Natural logarithm of board stock based compensation computed as the total stock and option compensation of all independent directors in a board, *CCOM* = Natural logarithm of CEO's stock based compensation calculated as the total of stock and option compensation, *PBCOM* = Percentage of board stock based compensation over total compensation, *PCCOM* = Percentage of CEO's stock based compensation over total compensation, *BOD x CEO* = Interaction term between *BOD* compensation and CEO compensation, *IOWN* = Institutional ownership computed as the percentage of shares held by institutional owners, *BIND* = Proportion of independent directors in the board, *BS* = Natural logarithm of total board members, *DUAL* = 1 if a CEO is also the Chairperson of the board, *CTEN* = CEO tenure measured as the natural logarithm of the number of years a CEO has been working as a CEO, *COWN* = Percentage of shares held by the CEO, *ISIZE* = Insurer size measured as the natural logarithm of total assets, *CAP* = Capital measured as the ratio of equity to total assets, *FV* = Franchise value measured as (Book value of assets + market value of equity – book value of equity) / Book value of assets. Superscripts ***, **, * represent significance levels at 1%, 5% and 10% respectively. Numbers in parentheses are t-statistic.

	(1)	(2)
PANEL A: Coefficients estimation		
<i>Board incentives</i>		
<i>BCOM</i>	0.071*** (6.673)	
<i>CCOM</i>	0.203** (3.478)	
<i>PBCOM</i>		0.404*** (6.535)
<i>PCCOM</i>		0.248** (3.729)
<i>BOD x CEO</i>	-0.053*** (-5.418)	-0.027** (-4.781)
<i>IOWN</i>	0.873*** (8.474)	0.799*** (8.695)
<i>Control variables</i>		
<i>BIND</i>	-0.464* (-2.863)	-0.425** (-3.915)
<i>BS</i>	0.265** (4.036)	0.267* (2.503)
<i>DUAL</i>	0.112* (2.563)	0.108* (2.789)
<i>CTEN</i>	-0.003 (-0.889)	-0.004 (-1.499)
<i>COWN</i>	1.046** (4.375)	1.106** (4.541)
<i>ISIZE</i>	-0.394** (-4.817)	-0.342** (-4.081)
<i>CAP</i>	0.245 (0.692)	0.099 (0.260)
<i>FV</i>	0.499** (4.498)	0.480** (3.426)
<i>Constant</i>	2.176** (4.051)	2.022* (3.092)
<i>YEAR</i>	Yes	Yes
PANEL B: Model fit		
<i>N</i>	458	452
<i>Within R²</i>	0.382	0.370

Table 12: OLS results of the board incentives and underwriting risk

This table reports the ordinary least square (OLS) estimation of equation (2):

$$Risk_{i,t} = \beta_0 + \beta_1(Board\ incentives)_{i,t} + \beta_2(BIND)_{i,t} + \beta_3(BS)_{i,t} + \beta_4(DUAL)_{i,t} + \beta_5(CTEN)_{i,t} + \beta_6(COWN)_{i,t} + \beta_7(BOWN)_{i,t} + \beta_8(EINDEX)_{i,t} + \beta_9(ISIZE)_{i,t} + \beta_{10}(INV)_{i,t} + \beta_{11}(CAP)_{i,t} + \beta_{12}(MB)_{i,t} + \beta_{13}(AQ)_{i,t} + \beta_{14}(MERGER)_{i,t} + \beta_{15}(ITYPE)_{i,t} + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t}$$

The dependent variable risk is the underwriting risk (*UR*). *UR* = Underwriting risk measured by the percentage change in total loss reserve, *BCOM* = Natural logarithm of board stock based compensation computed as the total stock and option compensation of all independent directors in a board, *CCOM* = Natural logarithm of CEO's stock based compensation calculated as the total of stock and option compensation, *IOWN* = Institutional ownership computed as the percentage of shares held by dedicated institutional owners, *BIND* = Proportion of independent directors in the board, *BS* = Natural logarithm of total board members, *DUAL* = 1 if a CEO is also the Chairperson of the board, *CTEN* = CEO tenure measured as the natural logarithm of the number of years a CEO has been working as a CEO, *COWN* = Percentage of shares held by the CEO, *BOWN* = Block ownership measured as the total percentage of shares held by unaffiliated block holders holding 5% or more shares, *EINDEX* = Proxy for entrenchment index, which is a sum of two dummy variables, staggered board and poison pill, *ISIZE* = Insurer size measured as the natural logarithm of total assets, *INV* = Natural logarithm of total investment in securities and loans, *CAP* = Capital measured as the ratio of equity to total assets, *MB* = Market to book ratio computed as the ratio of market value of equity to book value of equity, *MERGER* = 1 if there was any merger during the fiscal year; otherwise 0, *AQ* = 1 if a firm was audited by a big 4 accounting firm; otherwise 0, *ITYPE* = 1 for a life and health insurer; otherwise 0. Superscripts ***, **, * represent significance levels at 1%, 5% and 10% respectively. Numbers in parentheses are t-statistics.

	(1)	(2)	(3)
PANEL A: Coefficients estimation			
Board incentives			
<i>BCOM</i>	0.015** (2.061)		
<i>CCOM</i>		0.089** (2.180)	
<i>IOWN</i>			0.247** (2.384)
Control variables			
<i>BIND</i>	-0.028 (-0.361)	-0.033 (-0.431)	0.131 (1.390)
<i>BS</i>	-0.085* (-1.703)	-0.077 (-1.592)	-0.031 (-0.579)
<i>DUAL</i>	-0.002 (-0.079)	-0.010 (-0.439)	-0.005 (-0.222)
<i>CTEN</i>	-0.001 (-0.912)	-0.000 (-0.355)	-0.001 (-0.831)
<i>COWN</i>	-0.138 (-1.082)	-0.183 (-1.324)	-0.204 (-1.485)
<i>BOWN</i>	-0.080* (-1.794)	-0.107** (-2.083)	-0.148** (-2.420)
<i>EINDEX</i>	0.021 (0.984)	0.011 (0.456)	0.017 (0.804)
<i>ISIZE</i>	-0.048 (-1.063)	-0.064 (-1.273)	-0.038 (-0.940)
<i>INV</i>	0.008 (0.209)	0.002 (0.058)	-0.002 (-0.073)
<i>CAP</i>	0.036 (0.128)	0.049 (0.174)	-0.012 (-0.045)
<i>MB</i>	0.000 (0.903)	0.000 (1.419)	0.000 (1.266)
<i>AQ</i>	-0.063 (-0.897)	-0.067 (-0.945)	-0.062 (-0.843)
<i>MERGER</i>	0.101** (2.201)	0.105** (2.494)	0.120*** (2.823)
<i>Constant</i>	0.612*** (3.815)	0.771*** (3.919)	0.472*** (3.071)
<i>ITYPE</i>	Yes	Yes	Yes
<i>YEAR</i>	Yes	Yes	Yes
PANEL B: Model fit			
<i>N</i>	449	449	449
Adj. <i>R</i> ²	0.067	0.086	0.067
<i>F</i>	5.858***	6.641***	6.214***

Table 13: OLS results of the board incentives (stock based compensation) and performance

This table reports the ordinary least square (OLS) estimation of the following equation:

$$Performance_{i,t} = \beta_0 + \beta_1(Board\ incentives)_{i,t} + \beta_2(BIND)_{i,t} + \beta_3(BS)_{i,t} + \beta_4(DUAL)_{i,t} + \beta_5(CTEN)_{i,t} + \beta_6(COWN)_{i,t} + \beta_7(BOWN)_{i,t} + \beta_8(EINDEX)_{i,t} + \beta_9(ISIZE)_{i,t} + \beta_{10}(INV)_{i,t} + \beta_{11}(CAP)_{i,t} + \beta_{12}(VOL)_{i,t-1} + \beta_{13}(MB)_{i,t} + \beta_{14}(MERGER)_{i,t} + \beta_{15}(AQ)_{i,t} + \beta_{16}(ITYPE)_{i,t} + \sum_{t=1}^{2007-2010} \beta_t(YEAR)_t + \varepsilon_{i,t}$$

The dependent variable performance is Tobin's Q (*TOBINQ*), *BCOM* = Natural logarithm of board stock based compensation computed as the total stock and option compensation of all independent directors in a board, *CCOM* = Natural logarithm of CEO's stock based compensation calculated as the total of stock and option compensation, *IOWN* = Institutional ownership computed as the percentage of shares held by dedicated institutional owners, *BIND* = Proportion of independent directors in the board, *BS* = Natural logarithm of total board members, *DUAL* = 1 if a CEO is also the Chairperson of the board, *CTEN* = CEO tenure measured as the natural logarithm of the number of years a CEO has been working as a CEO, *COWN* = Percentage of shares held by the CEO, *BOWN* = Block ownership measured as the total percentage of shares held by unaffiliated block holders holding 5% or more shares, *EINDEX* = Proxy for entrenchment index, which is a sum of two dummy variables, staggered board and poison pill, *ISIZE* = Insurer size measured as the natural logarithm of total assets, *INV* = Natural logarithm of total investment in securities and loans, *CAP* = Capital measured as the ratio of equity to total assets, *VOL(t-1)* = Prior period volatility where volatility is measured as the yearly standard deviation of daily stock returns, *MB* = Market to book ratio computed as the ratio of market value of equity to book value of equity, *MERGER* = 1 if there was any merger during the fiscal year; otherwise 0, *AQ* = 1 if a firm was audited by a big 4 accounting firm; otherwise 0, *ITYPE* = 1 for a life and health insurer; otherwise 0. Superscripts ***, **, * represent significance levels at 1%, 5% and 10% respectively. Numbers in parentheses are t-statistic.

	(1)	(2)	(3)
PANEL A: Coefficients estimation			
Board incentives			
<i>BCOM</i>	0.011** (2.430)		
<i>CCOM</i>		0.093*** (5.020)	
<i>IOWN</i>			0.098* (1.823)
Control variables			
<i>BIND</i>	0.030 (0.513)	-0.002 (-0.033)	0.123** (2.104)
<i>BS</i>	-0.120** (-2.277)	-0.113** (-2.270)	-0.095* (-1.858)
<i>DUAL</i>	-0.032* (-1.841)	-0.040** (-2.301)	-0.033* (-1.891)
<i>CTEN</i>	0.004*** (3.770)	0.004*** (4.014)	0.004*** (3.752)
<i>COWN</i>	-0.306** (-2.567)	-0.310** (-2.433)	-0.360*** (-3.061)
<i>BOWN</i>	-0.066** (-1.997)	-0.081*** (-2.657)	-0.101*** (-2.894)
<i>EINDEX</i>	-0.030 (-1.329)	-0.040* (-1.839)	-0.032 (-1.407)
<i>ISIZE</i>	0.069** (2.267)	0.049* (1.773)	0.083*** (2.789)
<i>INV</i>	-0.082*** (-2.679)	-0.085*** (-2.874)	-0.095*** (-3.049)
<i>CAP</i>	0.097 (0.760)	0.022 (0.179)	0.096 (0.747)
<i>VOL (t-1)</i>	0.684 (1.614)	0.796* (1.774)	0.573 (1.311)
<i>MB</i>	0.001** (2.343)	0.001*** (3.077)	0.001** (2.338)
<i>Merger</i>	-0.001 (-0.019)	-0.004 (-0.105)	0.011 (0.318)
<i>AQ</i>	0.018 (0.487)	0.014 (0.386)	0.022 (0.568)
<i>Constant</i>	1.414*** (7.982)	1.627*** (8.763)	1.328*** (7.949)
<i>ITYPE</i>	Yes	Yes	Yes
<i>YEAR</i>	Yes	Yes	Yes
PANEL B: Model fit			
N	450	450	450
Adj. R ²	0.272	0.318	0.264
F	5.452***	5.966***	5.529***

Appendix A: Incentives comparison across industries

This appendix reports the average (mean) of the key incentives variables for insurance companies, banks and non-financial corporations, and also the t test results of the difference of these means. The sample covers all companies included in the Execucomp database over 2006-2010. The non-financial corporations exclude the financials and utilities. Banks are categorized following Pathan and Skully (2010). Insurance classification follows our own sample selection. To address the unequal sample size, the t-test incorporates two-sample t test with unequal variances using Welch (1947) approach.

Column (1) includes the key incentives variables. Column (2) through Column (4) report the mean of these key board structure variables. Column (5) and Column (6) report the t-statistic. *BODTOTAL* = Total compensation paid to the outside directors, *CEOTOTAL* = Total compensation paid to the CEO, *BCOM* = Stock based compensation paid to the outside directors, *CCOM* = Stock based compensation paid to the CEO. Superscripts *, ** and *** denote the significance level at 10%, 5% and 1% respectively.

1	2	3	4	5	6
Incentives variables	Insurance	Bank	Nonfinancial	Insurance - Bank	Insurance- Nonfinancial
<i>BODTOTAL</i> (mil.US\$)	1.771	1.253	1.369	6.141***	6.200***
<i>CEOTOTAL</i> (mil.US\$)	6.954	4.103	5.384	6.679***	4.804***
<i>BCOM</i> (mil.US\$)	0.822	0.480	0.753	6.258***	1.688*
<i>CCOM</i> (mil.US\$)	3.165	1.941	2.798	4.412***	1.786*

Source: Execucomp