

CORPORATE GOVERNANCE, AUDIT QUALITY AND RISK TAKING IN THE U.S. PROPERTY CASUALTY INSURANCE INDUSTRY

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Abstract

This paper examines the impact of corporate governance and audit quality on risk taking in the U.S. property casualty insurance industry. The evidence shows that some corporate governance variables, as well as some audit quality variables are related to risk taking. We find that longer board tenure is associated with low underwriting risk. But the higher percentage of financial experts on the board is associated with high underwriting risk. The possible reason is that financial experts possess a deep understanding of a firm's financial situation and may encourage the management to take higher risk in anticipation of a higher return for a positive net present value project. The results are consistent with agency theory and wealth transfer hypothesis in that high risk taking is consistent with shareholder interest maximization. In addition, we find a non-monotonic relation between insider ownership and leverage risk. Finally, we do not find evidence that the Sarbanes-Oxley act have impact on the risk taking behavior.

Keywords: Corporate governance, audit quality, underwriting risk, leverage risk, SOX Act

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1. Introduction

Risk-taking behavior of insurance companies is important to policyholders, stockholders, regulators, and other stakeholders. The relation between corporate governance and risk taking has been studied in a wide range of industries (e.g., Anderson and Fraser, 2000; Belkhir, 2006; John et al., 2007⁶¹; Laeven and Levine 2007⁶²; Sullivan and Spong, 2007). Little research has been conducted on the relation between corporate governance and risk taking in the property casualty insurance industry and no study examines the relation between audit quality and risk-taking behavior. Our research questions are stated as follows. First, we are interested in whether there is any impact of corporate governance and audit quality on the risk-taking behavior of U.S. property casualty insurance companies. Second, we wonder whether the Sarbanes-Oxley Act has any impact on the risk taking behavior.

Excessive risk taking of an insurance company rewards stockholders at the expense of policyholders. Galai and Masulis (1976) point out that shareholder

with limited liability have incentive to take excessive risk to maximize corporate value at the expense of policyholders. The reason is that shareholders benefit 100% of upside potential after paying the fixed obligations (e.g., interest payments), but limit their liabilities by sharing losses with other stakeholders (e.g., debtholders). The arguments can be applied into insurance companies. For insurance companies, the conflict of interests between stockholders and policyholders cannot be ignored. In particular, policyholders of insurance companies are risk adverse and relatively undiversified.⁶³

Corporate governance and proper auditing can mitigate the inappropriate excessive risk-taking behavior. The Public Accounting Reform and Investor Protection Act (the Sarbanes-Oxley Act, hereafter, SOX) were signed into law on July 30, 2002 to protect stakeholders of corporations. According to this Act, all public companies are required to strengthen board independence, e.g., forming independent audit committees and assigning at least one financial expert to serve as the audit committee director.

We believe audit quality is also important to risk-taking behavior. For example, the percentage of financial experts on the board can serve as a measure

⁶¹ John et al. (2007) use the Compustat global industries.

⁶² Laeven and Levine (2007) have discussed the bank industry.

⁶³ Dionne (2000) P. 507.

of audit quality. A company with a higher percentage of audit members on the board should provide higher audit quality.

In addition to examining the impact of corporate governance and audit quality on the risk-taking behaviors, we also examine whether there exists a significant change in risk-taking behaviors post-SOX.

Our sample consists of 36 public property casualty insurance companies from 2000 through 2004. The results show that board tenure is negatively associated with underwriting risk, but the percentage of financial experts on the board is positively associated with underwriting risk. Finally, we find there is a positive relation between leverage risk and insider ownership when insider ownership is in the range between 5 percent and 25 percent and a negative relation when insider ownership is beyond 25 percent. Examination of the impact of SOX shows that there is an increase in reinsurance ratio after the implementation of SOX.

Some contributions of this study are stated below. This study takes a comprehensive approach focusing on underwriting risk and leverage risk measures, while other studies use only one risk measure. Moreover, we find a non-monotonic relation between insider ownership and leverage risk. To the best of our knowledge, this is the first study to be conducted on the relations between corporate governance and audit quality variables on risk taking in the property casualty insurance industry.

2. Literature review and hypotheses

This section provides literature review. We first review the literature related to the relation between corporate governance and risk taking and then the relation between audit quality and risk taking. Finally, the literature related to SOX is discussed.

2.1 Relation between Corporate Governance and Risk Taking

It is important to review the literature related to the factors that affect risk-taking behavior before we review the literature related to the relation between corporate governance and risk taking. It is well known that managers are agents of shareholders who should maximize shareholders' wealth. One possibility is that managers seek the risk taking activity desired by the stockholders at the expense of policyholders as mentioned above. Owner and manager, however, generally have differing risk preferences. Agency theory argues that managers may adopt actions based on their own interests rather than shareholders' interests (Berle and Means, 1932; Jensen and Meckling, 1976; Fama and Jensen, 1983a, 1983b; Stiglitz, 1987). Jensen and Murphy (1990) show when manager interests are aligned with those of the owner agency problems are reduced. For example, when manager and owner interests are aligned, if the owner prefers higher risk taking so will the manager

(Downs and Sommer, 1999). Corporate governance is one way to mitigate agency problems. If board directors are effective in controlling agency problems, they will ensure that the management maximizes shareholders' wealth. John et al. (2007) suggest that managers avoid taking risk for position concerns. They also find that better investor protection and more effective monitoring mitigate the conservative activities resulting in higher risk in value enhancing projects. Shareholders with limited liability have more incentive to transfer benefits from policyholders to shareholders. Hence, the agency problem impacts on corporate risk in terms of manager, shareholder and policyholder interests. In terms of corporate governance and risk taking, CEO duality, average tenure of directors and insider ownership variables are considered. The relation between insider ownership and risk taking in property casualty insurance has rarely been discussed. Thus, whether insider ownership impacts on corporate risk taking is an interesting question for the property casualty insurance industry.

2.2 Relation between Audit Quality and Risk Taking

This section focuses the relation between audit quality and risk taking. Reports on corporate governance stress the importance of board committees such as audit, compensation and nomination committees as additional monitoring controls. According to the objective of Section 404 of SOX, corporate management should focus on the internal controls that best protect against the risk of a material financial misstatement. Section 404 provides for meaningful disclosure to investors about the effectiveness of a company's internal controls systems without creating unnecessary compliance burdens or wasting shareholder resources.⁶⁴

A number of studies have looked at this issue related to the relation between audit quality and risk taking. Some studies show a negative relation (Titman and Trueman, 1986; Simunic and Stein, 1987; Beatty, 1989) and others show a positive relation (e.g., Asthana et al., 2004; Knechel and Willekens, 2006; Bratton, 2007). None of the study that we are aware of examines the relation in the U.S. property casualty insurance industry.

2.3 Impact of SOX on Risk Taking

We next review the literature related to the impact on SOX. Boyle and Grace-Webb (2008) suggest that SOX has greater costs of auditing and less corporate investment and risk-taking. Litvak (2007) also finds firms take less risk after the SOX Act especially for high-growth and better governance firms. In addition,

⁶⁴ The Securities Exchange Commission has approved new guidance for compliance with section 404 of Sarbanes-Oxley, 2007.

Cohen et al. (2005) point out that for managers there is a reduction in the incentive to take higher risk after SOX (Bargeron et al., 2007⁶⁵). Kang and Liu (2007) find that managers of the firms with better corporate governance and less information asymmetry become more cautious in their investment decisions after enactment of SOX. But there is little research that focuses on the changes in risk taking in the property casualty insurance industry following the implementation of SOX.

2.4 Hypothesis Development

This section develops six hypotheses to test the impact of corporate governance and audit quality on the risk-taking behavior. The development of these hypotheses is based on the discussions in Ho et al. (2009).

CEO/chairman duality and risk taking

In serving simultaneously as CEO and chairman, a CEO will likely have greater stature and influence among board members (Harris and Raviv, 1988), thus hampering the board's independent monitoring capacity (Jensen, 1993; Beatty and Zajac, 1994). Studies suggest that separation of the CEO and chairman of the board helps to align the interests of the directors and stockholders (Kosnik, 1987; Baysinger and Hoskisson, 1990; Hoskisson and Turk, 1990; Denis and McConnell, 2003). Adams et al. (2005) find that firms, in which the decisions are made by a powerful CEO who also holds the position of chairman of the board, exhibit high risk-taking behavior as measured by stock return volatility. The likelihood of either very good or very bad decisions is higher in a firm whose CEO has more power to influence decisions than in a firm whose CEO has less power in the decision-making process. Upadhyay (2008) also finds that CEO/chairman of the board duality is positively related to risk when measured by the standard deviation of monthly stock returns.⁶⁶

On the contrary, managers that possess decision control may behave in a risk-reducing manner relative to the behavior of owner managers because of management's desire to maximize job security (Amihud and Lev, 1981). Belkhir (2006) finds that managers will avoid excessive risk taking in order to protect their positions. Bebchuk et al. (2006) find that a CEO playing a dominant role in the firm's decision-making may lead to more conservative (i.e., risk averse) decisions. The relation between CEO/chairman duality and risk taking is, thus, not clear and leads to the hypothesis:

Hypothesis 1: CEO/chairman duality is not related to risk taking in the property casualty insurance industry.

Board tenure and risk taking

MacCrimmon and Wehrung (1990) suggest that the most consistently risk adverse managers have longer seniority with their firm. Berger et al. (1997) point out that CEOs with longer tenures are more likely to be entrenched and will seek to avoid risk.⁶⁷ The literature indicates that longer tenure will result in lower risk taking. We propose the following null hypothesis:

Hypothesis 2: Board tenure is not related to risk taking in the property casualty insurance industry.

Insider ownership and risk taking

A series of studies suggests that insider ownership is positively associated with the firm's risk-taking behavior (e.g., Agrawal and Mandelker, 1987; Hill and Snell, 1988; Galbraith and Merrill, 1991; Esty, 1993, 1997; Palmer and Wiseman, 1999). When managers increase ownership, their interests become aligned with shareholders' interests, thus, they have a strong incentive to take higher risk under the wealth transfer hypothesis (Galai and Masulis, 1976⁶⁸; Saunders et al., 1990⁶⁹; Staking and Babbel, 1995; Cummins and Sommer, 1996⁷⁰; Chen et al., 2001). In addition, Downs and Sommer (1999) propose the risk-subsidy and monitoring hypotheses and find that the managers prefer higher risk taking when manager and owner interests are aligned. In summary, the above literature suggests a positive relation between insider ownership and risk taking.

However, in the risk aversion hypothesis put forth by Chen et al. (1998), managers with increased ownership become more risk averse and avoid excessive risk taking.⁷¹ Brewer et al. (1997) find that with increased insider holdings, large life insurers will seek to reduce risk taking. In addition, Sullivan and Spong (2007) find higher risk taking among banks in which the manager has a higher percentage of individual wealth invested in the bank's stock.⁷²

⁶⁷ Zhao and Lehn (2003) find that CEO age is associated with longer tenure. MacCrimmon and Wehrung (1990) also note that most consistently risk adverse managers are older.

⁶⁸ Galai and Masulis (1976) find appreciating value of call option by increasing risk from option price theory.

⁶⁹ Saunders et al. (1990) discuss a sample of depository institutions under different regulatory environments.

⁷⁰ Cummins and Sommers (1996) explore property-liability insurance companies risk taking under guaranty fund system.

⁷¹ Chen et al. (1998) support the risk aversion hypothesis for a sample of depositories. However, Chen et al. (2001) support wealth transfer hypothesis over this hypothesis for a sample of life insurance companies in the US.

⁷² However, they also point to less risk taking among banks in which the manager has significant motivation to monitor bank management.

⁶⁵ Bargeron et al. (2007) note that US firms reduce investment in risky projects when compared to firms in the UK.

⁶⁶ Upadhyay (2008) uses the previous 60 months of S&P 1500 firms excluding utilities and financial services firms.

Dolde and Knopf (2006) suggest that a U-shaped relation exists between insider ownership and risk taking for both stock and operating returns in thrift institutions. On the contrary, Gorton and Rosen (1995) find that there exists an inverted U-shaped relation between insider ownership and risk taking (i.e., risk taking increases with decrease in insider holdings).

In summary, the literature find the relation between insider ownership and risk taking is not clear and leads to the hypothesis:

Hypothesis 3: Insider ownership is not related to risk taking in the property casualty insurance industry.

Audit committee director percentage and risk taking

Corporate boards are responsible for monitoring managerial performance and financial disclosures, a task that is delegated to audit committees. Effective monitoring by the audit committee is very important to ensure reliable and complete financial reporting. The Blue Ribbon Committee (1999) proposed that the NYSE and NASDAQ require their registrants to have a minimum of three directors on their audit committees and recommended that all audit committee members be independent. Higher percentages of audit committee directors may lead to lower risk-taking behavior because audit committee directors are better equipped to monitor excessive and inappropriate risk taking. This argument is consistent with the results of prior studies that directors' concern for their reputation results in their ability to serve as effective monitors and their tendency to avoid risk taking (e.g., Fama and Jensen, 1983a). Based on the above argument, we propose the following null hypothesis:

Hypothesis 4: The percentage of audit committee directors on the board is not related to risk taking in the property casualty insurance industry.

Percentage of financial experts on the board and risk taking

One of the most controversial SOX provisions requires public companies to disclose to the SEC whether or not they have a financial expert on the audit committee of their board of directors.⁷³ Under

⁷³ Defond et al. (2005) suggest that financial expertise may be acquired in at least one of four ways: (i) education and experience as a principal financial officer, principal accounting officer, controller, public accountant or auditor, or experience in one or more positions that involve the performance of similar functions; (ii) experience actively supervising a principal financial officer, principal accounting officer, controller, public accountant, auditor or person performing similar functions; (iii) experience overseeing or assessing the performance of companies or public accountants with respect to the preparation, audit or evaluation of financial statements; or (iv) other relevant experience. According to the SEC definition, an "audit committee financial expert" must possess one or more of the

this rule, the board of directors determines whether or not the board should include a financial expert as part of the audit committee. Although this is framed as a disclosure rule, pressure from either the investment banking community or shareholders requires many boards to ensure that a financial expert is a member of the audit committee. The SOX specifies the responsibility of corporate officers for the accuracy and validity of corporate financial reports. Higher percentage of financial experts on the audit committee implies more effective monitoring, improved financial report quality and lower probability for managers to become entrenched. This may lead to high risk-taking behavior. The reason is that financial experts possess a deep understanding of a firm's financial situation and may encourage the management to take higher risk in anticipation of a higher return for a positive net present value project.

Chen et al. (2007) find that financial experts have invested a significant amount of effort in improving individual financial expertise and possess a strong incentive to maintain individual reputation in performing their monitoring role as an audit committee member. This is consistent with the results of prior studies that directors' concern for their reputation results in their ability to serve as effective monitors and their tendency to avoid risk taking (e.g., Fama and Jensen, 1983a). Other literature also argues that job security may result in low risk-taking behavior (e.g., Amihud and Lev, 1981; Belkhir, 2006). If a board member with financial expertise has concerns with his/her job security, then it will result in low risk-taking behavior. Thus, the relation between percentage of financial experts on the audit committee and risk taking is not clear, suggesting the hypothesis:

Hypothesis 5: The percentage of financial experts on the board is not related to risk taking in the property casualty insurance industry.

The SOX implementation effect

Chhaochharia and Grinstein (2007) point out that firms that are less compliant with the provisions of SOX earn positive abnormal returns when compared with firms that are more compliant.⁷⁴ The market may believe that greater monitoring in the post-SOX period is value enhancing. Thus, positive relations between ownership structure and abnormal returns would show

following criteria: experience actively supervising a principal financial officer, principal accounting officer, controller, public accountant, auditor or person performing similar functions; experience overseeing or assessing the performance of companies or public accountants with respect to the preparation, auditing or evaluation of financial statements and other relevant experience.

⁷⁴ Higher board score represents higher governance. The score is defined as possessing three or four of the following criteria: existence of independent directors, compensation committee, nominating committee and audit committee.

that the market rewards firms with more effective monitoring (Akhigbe and Martin, 2006). Li et al. (2006) and Jain et al. (2006) find a positive effect of SOX on firm value. However, Zhang (2005) argue that there is a negative effect of SOX on firm value. Please note that all the above literature examine the impact of SOX on firm value or abnormal return, none examine the impact on risk taking. We expect insurers would take less risk after SOX because the various provisions in SOX were meant to protect shareholders and other stakeholders. Therefore, we examine whether there are changes in the relation among corporate governance, audit quality and risk taking after SOX.

3. Data and Methodology

The sample data are collected from three databases. Corporate governance variables and audit quality variables are obtained from DEF 14A of the U.S. Securities and Exchange Commission for the period from 2000 through 2004. Risk taking variables including underwriting risk and leverage risk data are obtained from National Association of Insurance Commissioners (NAIC) and Compustat database. After eliminating the firms without complete data, we obtain 36 U.S. publicly traded property casualty insurance companies in the sample.

We use regression with panel model methodology for our analyses. The panel data comprise cross-sectional and time series data. The tests used are the Breusch-Pagan LM test, the F test and the Hausman test because our sample is in the form of panel data. Fixed effect or random effect is determined based on the Hausman test results. We present the risk taking model below and provide the dependent variable descriptions and independent variables.

$$\text{Risk taking}_{it} = \alpha_0 + \alpha_1 \text{Duality}_{it} + \alpha_2 \text{Btenure}_{it} + \alpha_3 \text{Insider } 0\% \sim 5\%_{it} + \alpha_4 \text{Insider } 5\% \sim 25\%_{it} +$$

$$\alpha_5 \text{Insider } 25\% \sim_{it} + \alpha_6 \text{Audit member}_{it} + \alpha_7 \text{Financial expert}_{it} + \text{Control variables}_{it} + u_{it}$$

Dependent variables

The dependent variables include underwriting risk and leverage risk variables. Underwriting risk is measured as the standard deviation of loss ratio (STDlossratio_{it}). The loss ratio is defined as the ratio of loss incurred divided by premiums earned. Leverage risk (Leverage_{it}) is measured by the ratio of one minus capital-to-assets. Similar measures of capital-to-assets ratio are used in the literature (Saunders et al., 1990; Sommer, 1996; Brewer et al., 1997; Downs and Sommer, 1999; Klein et al., 2002), as a measure of firm capitalization. An insurance company with higher leverage level has higher probability to become insolvent. The leverage is a major concern for all stakeholders.

Independent Variables

We classify independent variables into two categories: major independent variables and control variables. Major independent variables are further categorized

into corporate governance variables and audit quality variables. Our corporate governance measure is based on the characteristics that capture several aspects of the firm's governance environment: CEO/Chairman duality, board average tenure and insider ownership. The data are collected from SEC filings and company proxy statements. CEO/Chairman duality (Duality_{it}) is a binary variable, 1 = the CEO and chairman of the board is the same person, 0 = otherwise. Board average tenure (Btenure_{it}) is defined as average number of years that directors have served on the board. Insider ownership percentage (Insider_{it}) is defined as shares held by executive directors divided by the outstanding shares, which is the percentage of shares owned by officers and directors in the ownership structure (Weight et al., 1996; Downs and Sommer, 1999). We use piecewise regression analysis for insider ownership as proposed by Morck et al. (1988). The insider ownership has three ranges: fewer than 5 percent, between 5 percent and 25 percent and over 25 percent (i.e., $\text{Insider } 0\% \sim 5\%_{it}$, $\text{Insider } 5\% \sim 25\%_{it}$ and $\text{Insider } 25\% \sim_{it}$, respectively). These ranges can be further defined as follows:

$\text{Insider } 0\% \sim 5\%_{it}$ = insider ownership if insider ownership < 0.05,
= 0.05 if insider ownership \geq 0.05;

$\text{Insider } 5\% \sim 25\%_{it}$ = 0 if insider ownership < 0.05;
= insider ownership minus 0.05 if $0.05 \leq$ insider ownership < 0.25,
= 0.20 if insider ownership \geq 0.25;

$\text{Insider } 25\% \sim_{it}$ = 0 if insider ownership < 0.25;
= insider ownership minus 0.25 if insider ownership \geq 0.25.

Audit quality measure is based on characteristics that capture several aspects of the firm's audit committee: audit committee percentage and percentage of financial experts on the board. The data are collected from SEC filings and company proxy statements. Audit committee percentage (Audit member_{it}) is the percentage of audit committee members (Aigbe and Anna, 2006; Vafeas and Waagelein, 2007). Financial expert on the board percentage ($\text{Financial expert}_{it}$) is the percentage of financial experts on the board (Aigbe and Anna, 2006).

We control for characteristics of the firm (i.e., firm size), board size, Herfindahl index and reinsurance. The control variables are defined as follows: Board size (Bsize_{it}) is total number of directors on the board (Mayers et al., 1997). Net admitted assets ($\text{LN}(NA)_{it}$) is logarithm of net

admitted assets, which is a proxy for firm size (Mayers and Smith, 1994; Gollier and Pratt, 1996; Mayers et al., 1997; Beasley and Pertoni, 1998; Mayers and Smith, 2004; He and Sommer, 2006). Line of business Herfindahl index ($Herfindahl Index_{it}$) is $\sum (PW_i / TPW)^2$ where PW_i is the value of written premiums in line i ($i = 1, 2, \dots, 34$), and TPW is the insurer's total written premiums (Mayers and Smith, 1994; Carson and Hoyt, 1995; Gollier and Pratt, 1996; Sommer, 1996; Kleffner and Doherty, 1996; Mayers et al., 1997; Pottier and Sommer, 1997; Bajtelsmit and Bouzouita, 1998; Viswanathan and Cummins, 2003; Yu et al., 2005; Dionne et al., 2007; Grubisic and Leadbetter, 2007). $Herfindahl Index_{it}$ measures the line concentration and the levels of risk taking (Hill et al., 1992; Lamm-Tennant and Starks, 1993; John et al., 2007). Reinsurance ratio ($Reinsurance_{it}$) is measured ratio of reinsurance ceded divided by the sum of direct premiums written plus reinsurance assumed (Viswanathan and Cummins, 2003; Yu et al., 2005).

4. Summary Statistics and Empirical Results

4.1 Summary Statistics

Table 1 presents the summary statistics for all variable characteristics, including means, standard deviations, minimum values and maximum values of all samples. We find that the mean of Duality is 0.64. The result shows a tendency toward the CEO and board chairman of the board is the same person. The average number of directors on the board is 10.83. The board size is similar to that reported by Diacon and O'Sullivan (1995) and O'Sullivan and Diacon (2003). The average tenure of all directors is 11.44 years and the average directors' tenure is higher than the average of 8.6 years reported in other studies (e.g., Erickson et al., 2003). The average reinsurance ratio is 0.18, with maximum value of 0.889 and minimum value of 0.003. Higher reinsurance ratio implies that insurers tend to transfer their underwriting responsibility to other reinsurers, leading to lower underwriting risk. Finally, the average level of leverage risk is 0.75.⁷⁵

[Insert Table 1 here]

Table 2 presents the Pearson correlation coefficients for all independent variables. It shows that some variables are highly correlated. For instance, the percentage of financial experts on the board is positively related to the percentage of audit committee members (0.626 at 1 percent significant level). The

board size is negatively related to the percentage of audit committee members (-0.554 at 1 percent significant level). The LN (NA) is positively related to board size (0.574 at 1 percent significant level). In order to avoid the problem of multicollinearity, variance-inflation factors (VIFs) (Neter et al., 1985) of all independent variables are computed. The VIF values of all independent variables in the regression models are lower than 10 (not tabulated). Hence, the regression results are adversely affected by multicollinearity.

[Insert Table 2 here]

Table 3 shows the results of difference of means tests for all independent variables before and after the SOX Act. We find that reinsurance ratio significantly increases after SOX Act. It indicates that the insurers tend to hedge underwriting risk by buying reinsurance after SOX Act. The changes in other variables are not statistically significant.

[Insert Table 3 here]

4.2 Regression Analysis

Table 4 shows the regression results of underwriting risk on corporate governance and audit quality variables. Model 1 includes corporate governance variables, auditing quality variables and control variables such as board size, the log of net admitted assets and Herfindahl index. Model 2 adds the SOX Act dummy variable to examine the effect of the implementation of SOX. The dummy variable is 1 for years 2003 and 2004, and 0 otherwise. In model 3, the reinsurance ratio replaces Herfindahl index because both variables are negatively and significantly related (-0.913 at less than 1 percent level). Model 4 is similar to Model 2 except that we use reinsurance ratio rather than Herfindahl index.

We find board tenure is negatively related to underwriting risk for each of the models. This result rejects Hypothesis 2 and indicates that the board with longer tenure tends to be more conservative in making underwriting policies. This result is consistent with the findings of Berger et al. (1997) that longer board tenures are more likely to lead to reduction in risk taking. We also find the percentage of financial experts on the board is positively related to underwriting risk in all four models. This result rejects Hypothesis 5 and implies higher percentage of financial experts leads to higher underwriting risk. The reason is that financial experts possess a deep understanding of a firm's financial situation and may encourage the management to take higher risk in anticipation of a higher return for a positive net present value project. The results are consistent with agency theory and wealth transfer hypothesis (Saunders et al., 1990) in that high risk taking is consistent with shareholder interest maximization.

⁷⁵ Cummins and Nini (2002) find that the average capital-to-asset ratio is around 25 percent in 1985.

For the control variables, we find that firm size is negatively related to risk taking and the result is consistent with those of previous studies (Saunders et al., 1990; Gibson, 1995; Houston and James, 1996; Knopf and Teall, 1996; Brewer et al., 1997; Lai et al., 2007). The evidence also shows that there is a negative relation between Herfindahl index and risk taking in Models 1 and 2. In Models 3 and 4, we observe that there is a positive correlation between the reinsurance ratio and risk taking. These results are expected and consistent with the literature (Hoerger et al., 1990; Cummins and Nini, 2002; Demers, 2003⁷⁶). The coefficients of other control variables are not significant.

[Insert Table 4 here]

Table 5 shows the effects of corporate governance and audit quality variables on the leverage risk of insurers. We note that the leverage risk is computed by one minus the capital-to-assets ratios of insurers. Saunders et al. (1990) note that capital-to-assets ratio is a measure of financial leverage which is commonly used by regulators and investors. From the results of all four regression models, we find that a higher insider ownership is associated with a higher leverage risk when the insider ownership is in the range between 5 percent and 25 percent. However, the insurer's leverage risk will decrease as the level of insider ownership is beyond 25 percent. These results do not support Hypothesis 3 but demonstrate that there is a nonmonotonic relation between insider ownership and the insurer's risk taking behavior as mentioned by Dolde and Knopf (2006) and Gorton and Rosen (1995). For the audit quality variables, both the percentage of audit committee directors and the percentage of financial experts on the board do not significantly influence the insurer's leverage risk. These results show that the hypotheses 4 and 5 we established in section 2 can not be rejected.

For the control variables, the firm size is positively related to leverage risk. This evidence is denoted as the size effect in the literature. In Models 1 and 2 we find that the Herfindahl index is negatively associated with leverage risk. It indicates that an insurer with much diversified lines of business has more capacity to bear higher leverage risk. In Models 3 and 4 we also find the reinsurance ratio is positively correlated to the leverage risk. This result demonstrates an insurer ceding higher percentage of his businesses faces less loss payment in the future and tends to operate in higher leverage level. The coefficients of other control variables are not significant.

[Insert Table 5 here]

⁷⁶ According to Demers (2003) insurers that reinsure a greater percentage of premiums tend to exhibit a higher level of uncertainty.

5. Conclusion

This study examines the impacts of corporate governance and audit quality on risk taking. We consider both underwriting risk and leverage risk. Some of interesting findings are summarized below. First, the findings suggest board tenure is negatively related to underwriting risk, but the percentage of financial experts on the board is positively related to underwriting risk. The possible reason is that financial experts possess a deep understanding of a firm's financial situation and may encourage the management to take higher risk in anticipation of a higher return for a positive net present value project. The results are consistent with agency theory and wealth transfer hypothesis (Saunders et al., 1990) in that high risk taking is consistent with shareholder interest maximization.

Second, we find there is a positive relation between leverage risk and insider ownership when insider ownership is in the range between 5 percent and 25 percent and a negative relation when insider ownership is beyond 25 percent. The overall results of the insider ownership variables are consistent with the nonmonotonic relation between insider ownership and risk taking. Finally, we do not find evidence that the Sarbanes-Oxley act have impact on the risk taking behavior.

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Table 1. Descriptive statistics

The sample consists of 36 property casualty insurers with complete records during the period 2000-2004. STDlossratio is measured as the standard deviation of the loss ratio; loss ratio is defined as the ratio of loss incurred divided by premiums earned. Leverage is measured by one minus capital-to-assets ratio. Duality is a binary variable, 1 = the CEO and chairman of the board is the same person, 0 = otherwise. Btenure is defined as average number of years that directors have served on the board. Insider is defined as shares held by executive directors divided by the outstanding shares. Audit member is defined as the percentage of audit committee members. Financial expert is defined as the percentage of financial experts on the board. Bsize is defined as total number of directors on the board. LN(NA) is the logarithm of net admitted assets. Herfindahl Index = $\sum(PW/TPW)^2$, where PW_i is the value of written premiums in line i (i = 1,2,...,34), and TPW is the insurer's total written premium. Reinsurance is measured as the ratio of reinsurance ceded divided by the sum of direct premium written plus reinsurance assumed.

Variable	N	Mean	StdDev	Minimum	Maximum
STDlossratio	180	0.094	0.098	0.005	0.508
Leverage	180	0.753	0.126	0.086	0.920
Duality	180	0.639	0.482	0.000	1.000
Btenure	180	11.441	5.326	0.750	26.000
Insider	180	0.076	0.122	0.000	0.565
Audit member	180	0.376	0.118	0.130	0.778
Financial expert	180	0.315	0.153	0.071	0.714
Bsize	180	10.833	3.054	5.000	23.000
LN(NA)	180	14.760	1.662	10.571	18.274
Herfindahl Index	180	0.294	0.652	0.000	0.921
Reinsurance	180	0.175	0.580	0.003	0.889

Table 2. Correction Coefficient of Variable

The table shows the correlation coefficients for variables. Duality is a binary variable, 1 = the CEO and chairman of the board is the same person, 0 = otherwise. Btenure is defined as average number of years that directors have served on the board. Insider is defined as shares held by executive directors divided by the outstanding shares. Audit member is defined as the percentage of audit committee members. Financial expert is defined as the percentage of financial experts on the board. Bsize is defined as total number of directors on the board. LN(NA) is the logarithm of net admitted assets. Herfindahl Index = $\sum(PW/TPW)^2$, where PW_i is the value of written premiums in line i (i = 1,2,...,34), and TPW is the insurer's total written premium. Reinsurance is measured as the ratio of reinsurance ceded divided by the sum of direct premium written plus reinsurance assumed.

	Duality	Btenure	Insider	Audit member	Financial expert	Bsize	LN(NA)	Herfindahl Index	Reinsurance
Duality	1	0.17**	0.157**	0.025	0.051	0.069	0.234***	-0.065	0.057
		0.022	0.035	0.743	0.499	0.357	0.002	0.389	0.457
Btenure		1	0.449***	-0.211***	0.099	0.045	-0.126*	-0.094	0.082
			<.0001	0.005	0.186	0.548	0.093	0.211	0.287
Insider			1	-0.083	-0.018	-0.192***	-0.294***	0.048	-0.005
				0.267	0.809	0.01	<.0001	0.525	0.951
Audit member				1	0.626***	-0.554***	-0.218***	0.036	-0.026
					<.0001	<.0001	0.003	0.634	0.736
Financial expert					1	-0.388***	0.172**	-0.094	0.154*
						<.0001	0.021	0.208	0.044

Table 2 continued

Bsize	1	0.574***	-0.131**	0.036
		<.0001	0.08	0.643
LN(NA)		1	-0.288***	0.117
			<.0001	0.127
Herfindahl Index			1	-0.913***
				<.0001
Reinsurance				1

***significant at 1%, ** significant at 5%, * significant at 10%

Table 3. Mean Tests before and after the implementation of SOX Act (2002)

The table shows the results of difference mean tests before and after the implementation of SOX Act (2002). STDlossratio is measured as the standard deviation of the loss ratio; loss ratio is defined as the ratio of loss incurred divided by premiums earned. Leverage is measured by one minus capital-to-assets ratio. Duality is a binary variable, 1 = the CEO and chairman of the board is the same person, 0 = otherwise. Btenure is defined as average number of years that directors have served on the board. Insider is defined as shares held by executive directors divided by the outstanding shares. Audit member is defined as the percentage of audit committee members. Financial expert is defined as the percentage of financial experts on the board. Bsize is defined as total number of directors on the board. LN(NA) is the logarithm of net admitted assets. Herfindahl Index = $\sum(PW_i/TPW)^2$, where PW_i is the value of written premiums in line i ($i = 1, 2, \dots, 34$), and TPW is the insurer's total written premium. Reinsurance is measured as the ratio of reinsurance ceded divided by the sum of direct premium written plus reinsurance assumed.

Mean Test	Mean before 2002	Mean after 2002	P-Value
STDlossratio	0.093	0.097	0.771
Leverage	0.742	0.769	0.119
Duality	0.650	0.630	0.753
Btenure	11.662	11.110	0.497
Insider	0.023	0.024	0.913
Audit member	0.371	0.384	0.449
Financial expert	0.309	0.323	0.526
Bsize	10.870	10.780	0.843
LN(NA)	14.600	15.000	0.115
Herfindahl Index	0.330	0.241	0.371
Reinsurance	0.132	0.235	0.066*

***significant at 1%, ** significant at 5%, * significant at 10%

Table 4. Regression of Underwriting Risk on Corporate Governance Variables and Audit Quality Variables

Model 1 includes corporate governance variables, auditing quality variables, control variables as board size, LN (NA), Herfindahl index and reinsurance. Model 2 add the SOX Act dummy variable just as in model 1. SOX is a binary variable, 1 = if year is 2003 to 2004, 0 = otherwise. Model 3 is reinsurance replace of Herfindahl index. Model 4 is as same as Models 2. The dependent variable is underwriting risk (STDlossratio) measured as the standard deviation of loss ratio, the loss ratio is defined as the ratio of loss incurred divided by premiums earned. The independent variables are as follows: Duality is a binary variable, 1 = the CEO and chairman of the board is the same person, 0 = otherwise. Btenure is defined as average number of years that directors have served on the board. Insider is defined as shares held by executive directors divided by the outstanding shares. The insider ownership has three ranges: fewer than 5 percent, between 5 percent and 25 percent and over 25 percent as follows: Insider 0%~5% = insider ownership if insider ownership < 0.05 and Insider 0%~5% = 0.05 if insider ownership ≥ 0.05; Insider 5%~25% = 0 if insider ownership < 0.05, Insider 5%~25% = insider ownership minus 0.05 if 0.05 ≤ insider ownership < 0.25, and Insider 5%~25% = 0.20 if insider ownership ≥ 0.25; Insider 25%~ = 0 if insider ownership < 0.25, and Insider 25%~ = insider ownership minus 0.25 if insider ownership ≥ 0.25. Audit member is defined as the percentage of audit committee members. Financial expert is defined as the percentage of financial experts on the board. Bsize is defined as total number of directors on the board. LN(NA) is the logarithm of net admitted assets. Herfindahl Index = $\sum(PW_i/TPW)^2$, where PW_i is the value of written premiums in line i ($i = 1, 2, \dots, 34$), and TPW is the insurer's total written premium. Reinsurance is measured as the ratio of reinsurance ceded divided by the sum of direct premium written plus reinsurance assumed.

Underwriting Risk (STDlossratio)	Model 1		Model 2		Model 3		Model 4	
	Model 1	P value	Model 2	P value	Model 3	P value	Model 4	P value
Intercept	0.275**	0.015	0.305**	0.013	0.252**	0.029	0.290**	0.018
Duality	-0.012	0.371	-0.012	0.406	-0.010	0.444	-0.009	0.492
Btenure	-0.004***	0.005	-0.004***	0.006	-0.003**	0.025	-0.003**	0.030
Insider 0%~5%	-0.188	0.638	-0.207	0.606	-0.176	0.627	-0.195	0.591

Table 4 continued

Insider 5%~25%	0.185	0.318	0.171	0.361	0.137	0.415	0.120	0.477
Insider 25%~	-0.026	0.876	-0.010	0.951	0.017	0.908	0.036	0.812
Audit member	-0.117	0.159	-0.120	0.149	-0.101	0.196	-0.105	0.180
Financial expert	0.182**	0.036	0.183**	0.036	0.155*	0.067	0.157*	0.064
Bsize	0.003	0.259	0.003	0.227	0.004	0.267	0.004	0.202
LN(NA)	-0.011	0.123	-0.014*	0.095	-0.012	0.133	-0.015*	0.077
Herfindahl Index	-0.025***	<.0001	-0.025***	<.0001				
Reinsurance					0.028***	<.0001	0.029***	<.0001
SOX			0.005	0.514			0.009	0.324
Hausman test	17.32		17.83		15.50		14.64	
Adjusted R	0.166		0.168		0.186		0.191	
N	180		180		180		180	

***significant at 1%, ** significant at 5%, * significant at 10%

Table 5. Regression of Leverage Risk on Corporate Governance Variables and Audit Quality Variables

Model 1 includes corporate governance variables, auditing quality variables, control variables as board size, LN (NA), Herfindahl index and reinsurance. Model 2 add the SOX Act dummy variable just as in model 1. SOX is a binary variable, 1 = if year is 2003 to 2004, 0 = otherwise. Model 3 is reinsurance replace of Herfindahl index. Model 4 is as same as Models 2. The dependent variable is leverage risk as measured by one minus capital-to-assets ratio. The independent variables are as follows: Duality is a binary variable, 1 = the CEO and chairman of the board is the same person, 0 = otherwise. Btenure is defined as average number of years that directors have served on the board. Insider is defined as shares held by executive directors divided by the outstanding shares. The insider ownership has three ranges: fewer than 5 percent, between 5 percent and 25 percent and over 25 percent as follows: Insider 0%~5% = insider ownership if insider ownership < 0.05 and Insider 0%~5% = 0.05 if insider ownership ≥ 0.05; Insider 5%~25% = 0 if insider ownership < 0.05, Insider 5%~25% = insider ownership minus 0.05 if 0.05 ≤ insider ownership < 0.25, and Insider 5%~25% = 0.20 if insider ownership ≥ 0.25; Insider 25%~ = 0 if insider ownership < 0.25, and Insider 25%~ = insider ownership minus 0.25 if insider ownership ≥ 0.25. Audit member is defined as the percentage of audit committee members. Financial expert is defined as the percentage of financial experts on the board. Bsize is defined as total number of directors on the board. LN(NA) is the logarithm of net admitted assets. Herfindahl Index = $\sum(PW_i/TPW)^2$, where PW_i is the value of written premiums in line i ($i = 1, 2, \dots, 34$), and TPW is the insurer's total written premium. Reinsurance is measured as the ratio of reinsurance ceded divided by the sum of direct premium written plus reinsurance assumed.

Leverage Risk	(1 - capital-to-assets ratio)							
Model	Model 1	P value	Model 2	P value	Model 3	P value	Model 4	P value
Intercept	0.154	0.282	0.166	275	0.018	0.912	-0.007	0.968
Duality	0.003	0.866	0.004	849	0.000	0.990	0.000	0.985
Btenure	-0.001	0.748	-0.001	766	0.000	0.896	0.000	0.921
Insider 0%~5%	-0.649	0.237	-0.659	232	-0.551	0.310	-0.537	0.325
Insider 5%~25%	0.710***	0.006	0.703***	007	746***	0.003	0.757***	0.003
Insider 25%~	-0.708***	0.002	-0.700***	003	.723***	0.001	-0.735***	0.001
Audit member	0.176	0.111	0.174	116	0.164	0.160	0.167	0.155
Financial expert	-0.125	0.261	-0.125	263	-0.148	0.236	-0.149	0.234
Bsize	-0.002	0.537	-0.002	567	-0.002	0.739	-0.002	0.685
LN(NA)	0.042***	<.0001	0.041***	000	749***	<.0001	0.051***	<.0001
Herfindahl Index	-0.041***	<.0001	-0.041***	.0001				
Reinsurance					745***	<.0001	0.045***	<.0001
SOX			0.166	275			-0.007	0.968
Hausman test	26.030		29.510		9.590		9.580	
Adjusted R	0.355		0.355		0.398		0.398	
N	180		180		180		180	

***significant at 1%, ** significant at 5%, * significant at 10%