

## 台灣保險業公司治理結構對風險決策行為的影響

(Received Jul 27, 2008; First Revision Oct 19, 2008; Second Revision Apr 26, 2010;  
Accepted May 3, 2010)

保險業經營具有高度的社會性，再加上我國保險法對董監事及經理人課以無限清償責任，此特有的高度監理法規，提供檢視公司治理結構與保險公司風險決策行為關係之特殊研究環境。本文主要探討保險業之代理問題及其對保險業風險決策行為的影響。本研究蒐集保險業公司治理結構變數，採用迴歸模型分析公司治理對保險公司整體營運、業務與投資風險決策行為之影響。實證結果發現，保險公司股東投票權偏離現金流量權的幅度以及股權集中度對於保險業風險決策行為有正向影響；而現金流量請求權、董事會規模、獨立董事、總經理兼任董事長等變數，對於風險決策行為有負向影響。另外，內部經理人持股率與投資風險決策行為呈現倒 U 型關係。

**關鍵詞：**保險業、公司治理、風險決策行為

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## The Impacts of Corporate Governance Structures on Risk Taking by Insurance Companies in Taiwan

This paper investigates the impacts of corporate governance structures on risk taking behavior in the insurance industry. The corporate governance structure of the insurance industry in Taiwan, which holds board members fully responsible for cases of bankruptcy, offers an interesting environment in which to explore its unique regulatory impact on insurers' risk taking behavior. The evidence shows that, even under stricter regulatory rules, corporate governance still plays an important role in influencing risk taking by both property-liability and life insurers in Taiwan. Specifically, deviations of voting rights from cash-flow rights and ownership concentration have positive impacts on risk taking, whereas cash-flow rights, board size, board independence, and CEO duality have negative impacts on insurers' risk taking. The relationship between investment risk and insider ownership is inversely U-shaped.

**Keywords:** Insurance Industry, Corporate Governance, Risk Taking

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## 1. Introduction

Both finance and business research document a variety of agency conflicts within corporations. Agency theory predicts that there are mainly three types of agency problems: between managers and shareholders, between shareholders and debt holders, and between the ultimate owner and minority shareholders. The latter two types are especially problematic in the insurance industry in Taiwan because highly leveraged equity increases the residual claimants' incentive to increase risk (for example, Saunders, Strock and Travols 1990; Esty 1998). The literature has already suggested that the corporate governance structure plays an important role in influencing risk taking<sup>1</sup> by banks and non-insurance firms (for example, Saunders, Strock and Travols 1990; Wright et al. 1996; Anderson and Fraser 2000; Du and Dai 2005; Sullivan and Spong 2007; Laeven and Levine 2009). However, the influence of corporate governance mechanisms on corporate risk taking remains largely unexamined in the insurance literature. Previous insurance studies involving ownership structures and risk taking focused mainly on comparing the risk taking behavior of mutual insurers and stock insurers, but little is known about the impact of other corporate governance factors. This article attempts to fill this gap.

In addition, this issue is also important partly because of the presence of insurance regulators who have imposed stricter regulations regarding the liabilities of board members and managers to prevent bankruptcy and discourage excessive risk taking by insurers. The insurers' risk taking behavior is important because insurers have higher pressure to pay the cost of debt than other financial institutions. The debts of insurers mainly include prepaid premiums and policy reserves for future claims. Insurers grant implicit credit to these debts by discounting expected cash flow when they estimate insurance premiums, and most life insurers sometimes recognize investment income or guarantee interest rates on policyholder funds. Therefore, insurers may engage in strategic risk taking to meet the future obligations arising from written insurance contracts.

In addition to the arguments mentioned above, the relationship between corporate governance and risk taking is especially essential important in the insurance industry because of its high debt-to-equity ratio,<sup>2</sup> and the complexity of long-term life insurance contracts,<sup>3</sup> and

the existence of an insurance guarantee fund,<sup>3</sup> which gives incentives to shareholders and managers of insurance companies to engage in excessive risk taking, causing higher expected costs of financial distress, bankruptcy, or liquidation. Other researchers have studied the impact of ownership structure on risk taking in industrial firms (for example, Wright et al. 1996) or in the banking industry (for example, Laeven and Levine 2009). The financial environment of insurance firms provides this study with an ideal institutional setting to examine the risk taking engaged in by insurance firms because there are more solvency regulations monitoring insurer insolvency risk. Furthermore, compared to banks, life insurers issue insurance contracts with longer-time horizons. The longer-time horizon of life insurance contracts gives shareholders more opportunity to exploit policyholder interests. The insurance industry plays a crucial role in performing a financial intermediary function and in providing stability to the economy as a whole.

In this paper, we examine the impacts of corporate governance structures on risk taking in the insurance industry. This article extends the prior literature on corporate governance in several ways. First, our study is the first to consider the impact of deviations of voting rights from cash-flow rights<sup>4</sup> on risk taking by insurance firms, even though others have addressed this issue in other industries (for example, Lee and Yeh 2004; Du and Dai 2005).<sup>5</sup> Because the insurance industry is a highly regulated and leveraged industry, its risk taking incentives and consequences differ from those of non-financial industries, and results derived from other industries cannot be extended to financial service industries. By including voting rights and cash-flow rights in our analysis, we investigate whether conflicts of interest between majority and minority shareholders exist and whether these conflicts influence the insurers' risk taking. Second, we also examine the impact of managerial ownership and board structure on risk taking by insurance firms. Most previous insurance studies involving agency problems and risk taking emphasized ownership structures by comparing risk taking of mutual insurers and stock insurers. Nevertheless, studies in non-financial service industries and the banking industry showed that risk taking may be influenced by other corporate governance systems, such as managerial ownership or board compositions, suggesting that our analysis may be beneficial for all parties interested in

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<sup>1</sup> In this paper, risk taking reflects the risk choices in corporate operation decisions made by firms to enhance value. According to option theory, the reason firms engage in risk taking is because the pay to leveraged equity is similar to a call option on firm assets. Shareholders thus face a strong incentive to maximize their benefit by increasing risk and shifting the wealth from the debt holder to themselves (for example, Esty 1998).

<sup>2</sup> Agency problems occur in the insurance industry when the principal lacks sufficient information or knowledge on the complexity of long-term life insurance contracts to monitor and control the agent.

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<sup>3</sup> The compulsory insurance guaranty fund is used to compensate policyholders and third-party claimants of insolvent insurance companies, which leads to moral hazard problems in the insurance industry (Cummins 1988).

<sup>4</sup> According to La Porta et al. (2002), cash flow rights are the fraction of the firm's ultimate cash-flow rights owned by its controlling shareholder. La Porta et al. (2002) and Claessens et al. (2002) argue that when the largest shareholder controls a higher fraction of cash-flow rights, he or she will have a strong incentive to run the firm properly.

<sup>5</sup> The importance of cash-flow rights and deviations of voting rights from cash-flow rights in the relationship between corporate governance and risk taking are justified in detail in the hypothesis section.

the practices of insurance companies in Taiwan (for example, Saunders, Strock and Travols 1990; Wright et al. 1996; Anderson and Fraser 2000; Sullivan and Spong 2007).

Third, the unique characteristics of the insurance industry in Taiwan cause the industry to serve as a good research sample for investigating the impacts of corporate governance structures on risk taking. The Insurance Law requires that the board directors and managers maintain unlimited liability for violating insurance laws or regulations in conducting their business.<sup>6</sup> Saunders, Strock and Travols (1990) and Esty (1998) found that ownership incentives towards risk taking may be weaker in stricter regulatory regimes. Following the findings of Saunders, Strock and Travols (1990) and Esty (1998), we predict that ownership incentives towards risk taking may be weaker under the unlimited liability rule in Taiwan. Thus, it is appealing to examine whether stricter constraints of insurance regulations perform an internal corporate governance function in reducing ownership incentives towards risk taking as prior studies predicted.<sup>7</sup> Another distinct characteristic of Taiwanese insurance companies is that most insurance firms remain family-controlled. Burkart, Panunzi and Shleifer (2003) suggested that the controlling family would usually select a chief executive officer (CEO) to maximize its benefits, which include the value of its ownership and the private benefits obtained only if control is held within the family. The controlling family would make the decisions to enhance its private benefits, which might affect the risk taking decision. In addition, most Taiwanese insurance firms are characterized by relatively low proportions of outside board members and by few takeovers.

Moreover, this study extends the prior literature

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<sup>6</sup> According to Article 153 of the Taiwanese Insurance Law, where an insurance company violates insurance laws or regulations in conducting its business, and this results in a situation where its assets are insufficient to pay off its debts, its chairman of the board of directors, directors, supervisors, president, and managers responsible for deciding such business matters shall bear unlimited joint and several liability to the company's creditors. The competent authority may notify the relevant authorities or institutions that they are prohibited from transferring, delivering, or otherwise encumbering property of persons who shall bear the unlimited joint and several liability referred to in the preceding paragraph, and may also instruct immigration authorities in writing to prevent such persons from leaving the country. Each of the said responsible persons shall be discharged from the liability referred to in paragraph 1 three years after the date of registration of dismissal from his/her position.

<sup>7</sup> In practice, the effect of stricter regulations may not be observed since insurance firms may adopt a strategy to avoid the scrutiny of regulation (for example, hide their assets or earnings in advance, so that the hidden assets are not discovered and not subject to distribution). However, under the Insurance Law in Taiwan the unlimited liability of directors and officers cannot be completely avoided because their future income will be withheld when the insurance firm goes bankrupt.

in being the first study to consider both life and property-liability insurers, thus permitting the study to compare the impacts of corporate governance on risk taking by both industry segments using the same analytical framework. Finally, the financial services industry in Taiwan was affected by the financial crisis in 1997, which highlighted the need for corporate governance reform. Because of these characteristics and the unique environment in the insurance industry in Taiwan, we believe that our empirical findings provide additional insights into the impact of corporate governance on risk taking by insurance firms.

We collect unique data on corporate governance and risk taking during 2000–2002 from both property-liability and life insurance companies in Taiwan. Our evidence confirms that corporate governance plays an important role in influencing risk taking in the two industry segments. Specifically, deviations of voting rights from cash-flow rights and ownership concentration have positive impacts on profit risk for life insurance firms and investment risk for property-liability insurance firms, whereas cash-flow rights, board size, board independence, and CEO duality have negative impacts on insurers' different risks. Moreover, the relationship between investment risk and insider ownership is inversely U-shaped for both property-liability and life insurance companies. In addition, our findings suggest that stricter constraints of insurance regulations may reduce or replace some internal corporate governance functions of controlling shareholders' incentives towards risk taking as prior studies predicted.<sup>8</sup>

The implications of our findings are important for stakeholders and insurance regulators. First, our findings suggest that some of the corporate governance mechanisms could help to prevent insurance firms from engaging in excessive risk taking. Second, a stricter liability rule imposed on insurance firms does not effectively discourage risk taking as a whole.

The remainder of this article is organized as follows. In Section 2, we present a related literature review and develop our hypotheses. We describe the sample data and explain the method we used to trace cash-flow rights and voting rights, based on La Porta, Lopez-de-Silanes and Shleifer (1999), in Section 3. Section 4 highlights the regression analysis, and Section 5 analyzes our regression findings regarding the impact of corporate governance on risk taking. In Section 6, we summarize and conclude.

## 2. Literature Review and Hypotheses Development

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<sup>8</sup> For example, prior studies predict that if controlling shareholders owning voting rights in excess of their cash-flow rights have an incentive to entrench the interests of minority shareholders by increasing risk, the deviation between voting rights and cash-flow rights will have a significantly positive impact on risk, other things being equal. We find under a stricter liability rule environment that the coefficient of the deviation between voting rights and cash-flow rights becomes insignificant.

In this section, we review the prior literature and develop six hypotheses to test the impact of corporate governance structures on risk taking behavior in the insurance industry. The corporate governance structures include cash-flow rights, the level of deviation between voting rights and cash-flow rights, insider ownership, board size, the percentage of outside board members, and the presence of CEO/chairperson duality.

To maintain the solvency of a firm and minimize risk, it is important to provide adequate financial incentives to the controlling shareholder. Cash-flow rights provide an incentive for major shareholders to run the firm properly. If the controlling shareholder has substantial cash-flow rights, it will suffer a large cash-flow loss if the firm takes on extra risk and enters bankruptcy. La Porta et al. (2002) and Claessens et al. (2002) both contended that the controlling shareholders have strong incentives to run the firm properly when they have substantial cash-flow rights. Empirically, Wang, Jeng and Peng (2007) found that the higher the cash-flow rights of the major shareholder, the more efficient the insurer's performance among Taiwanese property-liability insurers. Lee and Yeh (2004) also documented that cash-flow rights are negatively related to financial distress. On the other hand, if the shareholders hold less cash flow rights, they will suffer less cash-flow loss if the firm performs poorly. Shareholders owning less cash flow rights thus have a stronger incentive to maximize profit by increasing risk and shifting the wealth from the policyholders to themselves since they will suffer less cash-flow loss and will have limited liability if the firm encounters bankruptcy. However, as mentioned, the Insurance Law in Taiwan holds board members and managers fully responsible for cases of bankruptcy; the law forces shareholders to operate in a safer manner, thus mitigating their incentive to take higher risks. Hence, under this regulation, the shareholders might not try hard to increase risk maximizing their profit, as the previous studies suggested. Based on this reasoning and the above findings in the literature, we advance the null hypothesis that cash-flow rights in the hands of the controlling shareholder have no impact on a firm's risk taking behavior. A rejection of the null hypothesis implies that cash-flow rights in the hands of the controlling shareholder are significantly related to risk taking behavior.

**Hypothesis 1: No relationship exists between cash-flow rights in the hands of the controlling shareholder and risk taking**

The controlling shareholder may use complicated cross-shareholding patterns or build pyramids to exercise control, even with limited ownership of capital. La Porta, Lopez-de-Silanes and Shleifer (1999), Claessens, Djankov and Lang (2000), and Claessens et al. (2002) revealed that the controlling shareholders of publicly-traded firms usually possess voting rights significantly in excess of their cash-flow rights, which provides them with an incentive to expropriate the interests of minority shareholders. The greater the deviation between voting rights and cash-flow rights, the stronger these entrenchment motives may be. Du and Dai (2005) argued

that higher voting rights imply that the controlling shareholder has greater control rights and excess cash reserves under its control when the firm fares well, from which shareholders may obtain various benefits. By contrast, the relatively less ownership of capital by a shareholder suggests that it has relatively minimal cash losses when the firm does not fare well. Such unbalanced gain and loss effects for controlling shareholders provide them with incentives to take more risk. Lee and Yeh (2004) further argued that the deviation between voting rights and cash-flow rights relates to corporate governance risk; they found that this deviation relates positively to the risk of financial distress. Similarly, Du and Dai (2005) found that the separation of cash-flow rights and control rights results in a risk taking tendency among large controlling shareholders in financial decisions made in the East Asian economies.

However, because Taiwanese insurance companies are subject to stricter regulatory control and supervision, the unlimited liability rule may discourage excessive risk taking. Thus, even if shareholders possess voting rights significantly in excess of their cash-flow rights, they may face less incentive to expropriate the interests of minority shareholders by engaging in excessive risk taking. The strict liability rule should mitigate the incentive to engage in risk taking by forcing controlling shareholders to bear a greater proportion of the losses associated with negative outcomes. Thus, according to the above literature and arguments, we propose the null hypothesis that the level of deviation between the voting rights and cash-flow rights of the controlling shareholder has no impact on a firm's risk taking. The rejection of the null hypothesis implies that the deviation between voting rights and cash-flow rights has a significant impact on risk taking.

**Hypothesis 2: No relationship exists between the level of deviation between the voting rights and cash-flow rights of the controlling shareholder and risk taking**

Insider ownership represents another important component of corporate governance that influences risk taking. The impact of insiders on firm risk is critical because their decisions affect a firm's operation and survival. Amihud and Lev (1981) suggested that when insiders own small equities, they have an incentive to reduce risk taking because their income is linked to changes in corporate value. However, Saunders, Strock and Travols (1990) found that if bank insiders hold a relatively large proportion of stock, their banks exhibit significantly higher risk taking. Gorton and Rosen (1995) argued that the relationship between risk taking and the share of insider stock ownership is inversely U-shaped, such that if insiders have ownership in the firm, their interests align more closely with those of the stockholders, which boosts their risk taking incentives to increase the value of their equity. If insiders maintain ownership of the firm beyond a certain point, however, they have a large undiversifiable stake in the firm and may avoid extra risk. Empirically, Wright et al. (1996) found evidence consistent with Gorton and Rosen's (1995) argument.

Nevertheless, under the Insurance Law in Taiwan, insiders are fully responsible for cases involving bankruptcy for a period of three years. In such cases, the liability rule may mitigate the incentive of insiders to engage in excessive risk taking and reduce agency conflicts between insiders and shareholders. However, we contend that some imperfections still allow us to benchmark agency conflicts between insiders and shareholders. First, in a world with unlimited liability for shareholders and insiders for cases involving bankruptcy, the objectives of the shareholders and the insiders are aligned. The agency conflicts between shareholders and insiders are reduced and insiders may not act in a manner that is detrimental to the shareholders or the firm. However, the insider is subject to this unlimited liability rule for only three years after his dismissal from his position, rather than for an unlimited period. This imperfection still allows for the possibility of agency conflicts between insiders and shareholders. Second, intervention in the form of insurance guaranty funds leads to moral hazard problems (Cummins 1988). With the protection of guaranty funds, policyholders have less incentive to monitor the behavior of insiders of insurance companies, thus causing insiders to act in a manner detrimental to the shareholders in order to maximize their utility. Moreover, insurance guaranty funds will reimburse policyholders or third-party claimants when the insurance company is insolvent, thus reducing the liability of the insider imposed by the unlimited liability rule. In addition, because takeovers are rare in the insurance industry in Taiwan, it is more difficult to control agency problems between insiders and shareholders through a takeover. Therefore, although regulators have imposed stricter liability on the insider, the risk taking might be influenced by agency conflicts between insiders and shareholders for the reasons mentioned above. In practice, agency problems between insiders and shareholders occur in the insurance industry,<sup>9</sup> supporting our contention that some imperfections still allow for the presence of agency conflicts between insiders and shareholders. Based on the studies referred to in the above literature and such reasoning, we develop the null hypothesis that the level of insider ownership has no impact on risk taking.

### **Hypothesis 3: No relationship exists between insider ownership and risk taking**

The board of directors can be another effective device for controlling agency problems. Board members help their firms ratify and monitor important decisions made by the managers. As Jensen (1993) argued, over-

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<sup>9</sup> According to a newspaper report, the general manager of the Union Insurance Company in the P/L insurance industry in Taiwan was investigated for illegal financial transactions and for alleged breach of fiduciary trust in buying real estate from the Rebar group. The general manager of the Union Insurance Company was one of the family members of Rebar Group executives (The China Post Staff 2007). This implies that an insider of an insurance company might still act unlawfully or act in a manner detrimental to the firm, even if the stricter unlimited liability rule is imposed on the insider.

sized boards are less likely to function effectively; as Changanti, Mahajan and Sharma (2007) contended, larger boards have greater difficulty coordinating, which allows managers to follow their own goals, and not the goal of maximizing shareholders' wealth. Empirically, Judge and Zeithaml (1992) revealed that board size is negatively related to board involvement in strategic decision making. Simpson and Gleason (1999) further argued that the impact of board size on risk taking is negative. Smaller boards may function more effectively and create closer alignments with shareholder interests. Goodstein, Gautam and Boeker (1994) and Firstenberg and Malkiel (1994) argued that when the board size is larger and the board members are more diverse, it is helpful for the firm to use board members' diversified knowledge in dealing with specialized and complicated decisions, thus reducing the probabilities of improper risk taking decisions by managers. Therefore, the larger and more diversified board helps to monitor the managers and discourage them from exposing the firm to higher risk. However, under the unlimited liability constraint, the objectives of board members and managers are more aligned, reducing the agency cost of outside equity. We thus propose the null hypothesis that there is no relationship between board size and risk taking.

### **Hypothesis 4: No relationship exists between board size and risk taking**

On the basis of the outsider dominance perspective, Kesner, Victor and Lamont (1986) alleged that outside board members can evaluate management's performance more freely and act to remedy inappropriate or unacceptable situations, because the independence of the outside board can strengthen the effectiveness of its overall monitoring. In addition, Fama and Jensen (1983) and Jensen (1993) contended that outside board members act as arbiters in disagreements among internal managers and undertake tasks that involve serious agency problems between internal managers and shareholders. Kesner, Victor and Lamont (1986) further suggested that a negative relationship exists between the proportion of outsiders and illegal actions. On the other hand, Daily and Dalton (1994) found that bankrupt firms display higher proportions of affiliated directors than surviving firms, and Elloumi and Gueyie (2001) revealed that financially distressed firms have relatively small proportions of independent boards. The empirical studies thus imply that board independence is negatively related to risk. However, the unlimited liability rule holds both inside and outside board members fully responsible for cases of bankruptcy, thus weakening the negative relationship between board independence and risk taking. Therefore, we advance the null hypothesis that there is no relationship between the percentage of outside board members and risk taking.

### **Hypothesis 5: No relationship exists between the percentage of outside board members and risk taking**

Finally, the presence of a CEO duality structure may represent another key element of a board. The issue of CEO duality has recently received attention because it

commonly appears in many large corporations (Kesner, Victor and Lamont 1986). The role of the board is to monitor the management team, especially the CEO. However, the CEO is a professional manager, and his or her job is to speak on behalf of management. Jensen (1993) thus contends that an effective board should assign different people to the positions of CEO and chairperson of the board, because the CEO cannot perform his or her duties separately from his or her personal interests.

However, the presence of duality would provide the CEO with greater power over the board and firm. Proponents of duality instead argue that the dual CEO/chairperson of the board provides better strategic vision and better leadership. Empirically, Simpson and Gleason (1999) suggested that the dual CEO/chairperson is more likely to pursue his or her own interests and to take fewer risks to protect his or her unique human capital. As we mentioned previously, the Insurance Law in Taiwan holds board members and managers fully responsible for firm bankruptcy, which may also provide a stronger incentive to the dual CEO/chairperson to maintain the solvency of the insurer. On the basis of prior studies and arguments, we propose the null hypothesis that there is no relationship between the presence of CEO duality and risk taking.

**Hypothesis 6: No relationship exists between the presence of CEO/chairperson duality and risk taking**

### 3. Sample Data

To estimate the level of risk taking for life and property-liability insurers, we collected financial data from the *Annual Report of Life Insurance* and the *Non-Life Insurance Review* filed with the Taiwan Insurance Institute over the sample period from 2000 to 2002. Furthermore, to generate corporate governance variables, including voting rights and cash-flow rights, we collected insurers' shareholder data from annual statements for regulators from 2000 to 2002.<sup>10</sup> Our final sample contained 35 life and property-liability insurance companies, together accounting for about 85.51 % of industry premiums in 2002.<sup>11</sup>

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<sup>10</sup> We include data for three years from 2000 through 2002. Since the ownership structure of the insurance industry has not changed substantially and the insurance industry has not experienced any wave of reorganization, mergers and acquisitions, or any changes in related regulation, focusing on the three most recent time periods could not have changed our main conclusions. In addition, focusing on a shorter time period enables the insurance market conditions affecting insurers' risk taking behavior to be more homogeneous. This aspect of our sample is important because the solvency requirement for insurers changed significantly after the adoption of the Risk-Based Capital system in 2003.

<sup>11</sup> As of 2002, there were 54 insurers in Taiwan, including 28 life insurers and 26 property-liability insurers. We exclude 9 life insurers and 10 property-liability insurers from our sample because they represent branch offices of for-

We specifically traced cash-flow rights and voting rights held by the controlling shareholder for each sample company, according to the ultimate control concept proposed by La Porta, Lopez-de-Silanes and Shleifer (1999). In addition, we defined family ownership as ownership held by a group of people with blood or marriage ties to immediate family members and the legal entities controlled by these family members. Because many life and property-liability insurance firms in Taiwan have concentrated on ownership, usually by family groups, we used family ownership as the basic unit of analysis. In most cases, the families control the firm through a chain of companies. To confirm family ownership, we consulted various information sources and documents to verify the relationships among the main shareholders. Ownerships held by family-affiliated members represent the family's voting rights. Family cash-flow rights equal the product of their ownership of intermediate corporations along the chain. Finally, we added individual cash-flow rights along the chain to derive the total level of family cash-flow rights.<sup>12</sup> For demonstration purposes, we used one life insurer as an example to illustrate the calculation of cash-flow rights and voting rights for our sample firm in Figure 1. These unique data pertaining to the corporate governance structures of an insurance company enabled us to investigate the relationship between corporate governance structures and risk taking.

### 4. Regression Analysis

We examined how corporate governance structures influence risk taking by conducting a regression analysis with risk taking variables as the dependent variables and corporate governance and other control variables as explanatory variables. Because we considered both life and property-liability insurance companies, we required proxies for risk taking that are applicable to both segments of the insurance industry and that enabled us to compare the corporate governance factors that influence risk in two different industry segments using the same measurements.

#### 4.1 Risk Taking Variables

To measure the risk taking behavior of life and property-liability insurance firms, we referred to prior literature on risk taking by insurance firms (for example, Lamm-Tennant and Starks 1993; Lee, Mayers and Smith 1997; Berger et al. 2000; Viswanathan and Cummins 2003) and incorporated three established risk taking proxies: business risk, investment risk, and profit risk. We took the standard deviation of the log value of underwriting income as the proxy for business risk, used the standard deviation of stock holdings as a proxy for investment risk, and considered the standard deviations of returns on equity (ROE) as the proxy for profit

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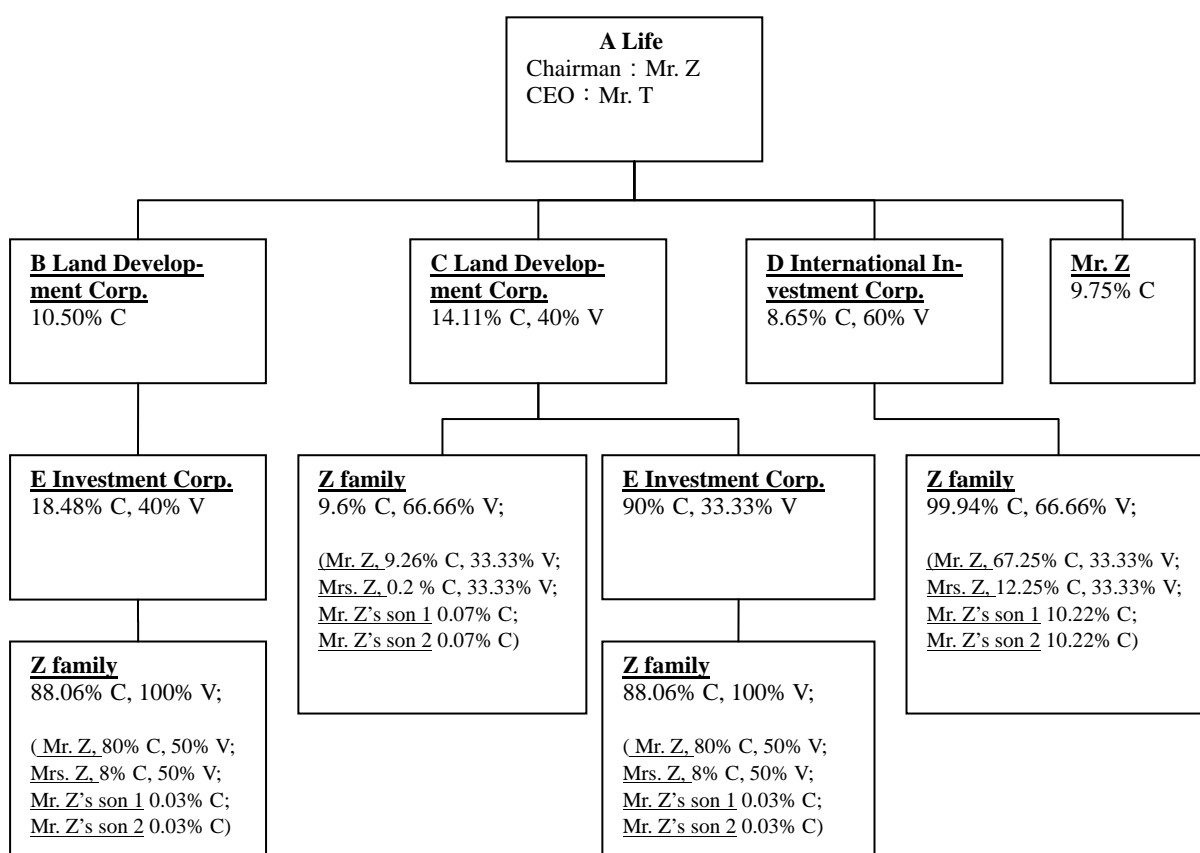
eign insurers and thus do not provide sufficient details regarding their corporate governance structure.

<sup>12</sup> For a demonstration of the calculation of voting and cash-flow rights, please refer to Wang, Jeng and Peng (2007).

volatility. We took the business activities and investment activities of insurers into account because insurers perform risk management as well as financial intermediary functions. According to Lamm-Tennant and Starks (1993), we measured business risk as underwriting income volatility. In line with Lee, Mayers and Smith (1997) and Ibbotson and Sinquefeld (1989), we took the standard deviation of stock holdings in the total invested assets as a proxy for investment risk. The standard deviation of stock holdings was hypothesized to relate to the uncertainty of future profitability from stock holdings. The findings of Lee, Mayers and Smith (1997) and Ibbotson and Sinquefeld (1989) suggested

that the standard deviation of stock holdings reflects investment stability and the discretion agents have in adjusting the investment holdings to pursue their risk taking goal. As for the proxy for profit volatility, following Berger et al. (2000) and Berger and Bonaccorsi di Patti (2006), we used the standard deviations of ROE. We did not use the measurement of risk that reflects market value, such as portfolio risk in the Capital Asset Pricing Model (CAPM) context, because most insurers in Taiwan are not publicly-traded firms and such data are not available for most life and property-liability insurers.

**Figure 1**  
**Calculation of Cash-flow Rights and Voting Rights for A Life.**



**Notes:** C denotes cash flow rights and V denotes voting rights.

The chairman of A Life is Mr. Z, who is the ultimate principal shareholder of A Life. The controlling shareholder of A Life is the Z family. The members of the Z family include Mr. Z, Mrs. Z, Mr. Z's son 1, and Mr. Z's son 2. The Z family owns 100% of the votes in A Life, 40% of the indirect votes of C Land Development Corporation and 60% of the indirect votes of D International Investment Corporation. The Z family retains 32.64% of the cash flow rights in A Life, which equals 9.75% of the direct cash flow rights plus 22.89% of the indirect cash flow rights. The calculation of voting rights and cash-flow rights for the Z family is as follows:

1. Voting Rights are equal to the sum of the voting rights of intermediate corporations along the chain controlled by the Z family. Voting Rights (indirect) = (40%+60%)=100%.
2. Cash-Flow Rights equal the sum of the product of the Z family's cash-flow rights of intermediate corporations along the chain. Cash-Flow Rights=(direct)9.75% + (indirect) [ 88.06% x 18.48% x 10.50% ] + [ 9.6% x 14.11% ] + [ 88.06% x 90% x 14.11% ] + [ 99.94% x 8.65% ] = 32.64%.



## 4.2 Corporate Governance Variables

To address the question of how cash-flow rights and deviation between voting rights and cash-flow rights affect risk, we included these measures in the regression analysis. As mentioned previously, risk should be lower as the cash-flow rights held by the controlling shareholder increase; however, the deviation between voting rights and cash-flow rights (voting rights – cash-flow rights or voting rights / cash-flow rights) may also be associated with greater risk taking. To test whether the relationship between risk taking and the share of insider stock ownership is inversely U-shaped as prior studies predicted, we followed Cebenoyan, Cooperman and Register (1999) and included insider ownership and the square of insider ownership in the model. To examine the effectiveness of the board in monitoring risk taking, we also considered board of director components, namely, ownership concentration, board size, board independence, and CEO duality. With regard to the additional explanatory variables, we followed previous studies (for example, Lamm-Tennant and Starks 1993; Berger et al. 2000; Mayers and Smith 2000; Baranoff and Sager 2002; Baranoff and Sager 2003) and included the capital-to-asset ratio, line of business concentration (that is, the Herfindahl concentration index), average rate of return, and asset size as control variables.

The rationale for using these proxies was as follows. The capital-to-asset ratio is related to financial leverage and risk, although we did not have a clear prediction for the direction of this relationship. According to transaction cost economics (Williamson 1988), debt financing is harder for firms that have more risk, because riskier firms face greater uncertainty with regard to fulfilling their obligations to repay the debt. Thus, firms with more risk must hold more capital assets, and the capital-to-asset ratio should relate positively to risk. However, Cummins (1988) argued that the flat premiums for insurance guaranty funds in the insurance industry cause insurers to increase risk at lower levels of capital, in which case the capital-to-asset ratio would relate negatively to risk.

We also predicted that the expansion into different lines of business relates negatively to risk; that is, firms focusing on a single line of business may suffer more risk. We captured the expansion into different lines of business by examining the firm's line of business Herfindahl concentration index, a measure of line concentration.<sup>13</sup> Thus, we expected that the Herfindahl concentration index relates positively to risk.

Theoretically, higher returns are accompanied by higher risk. Furthermore, a return represents an objective that firms attempt to maximize by taking appropriate risks. Baranoff and Sager (2002) found that higher returns on capital are associated with higher product risk by insurance firms. Thus, we expected that returns are positively related to risk. With regard to the relationship between firm size and risk taking, Baranoff and

<sup>13</sup> The Herfindahl index equals the square sum of each firm's individual line of business to its total line of business based on premium income.

Sager (2003) found that larger insurance firms are likely to have more risky asset portfolios than smaller firms. In addition, Lamm-Tennant and Starks (1993) contended that the size of the insurance firm is a critical means to control for risk. Thus, we hypothesized that the size of the insurance company is related to risk. However, prior studies (for example, Saunders, Stroock and Travols 1990; Cummins and Sommer 1996) yielded inconclusive results; hence, we did not have a clear prediction for the direction of the relationship between size and risk.

According to Mayers and Smith (2000), reinsurance is also a mechanism to reduce risk, and thus we expected that the property-liability insurers ceding a higher proportion of their premiums to reinsurers would have less risk. Therefore, we also included a reinsurance ratio in the model for property-liability insurers to control for the possible influence of reinsurance on a firm's risk.

## 4.3 Regression Model

Because the unique characteristics that may influence a firm's risk taking differ across industries, we further separated our regression analyses into those for life insurers and those for property-liability insurers and included specific control variables that may affect each industry.<sup>14</sup> Prior studies on corporate governance (for example, Bromiley 1991; Wright et al. 1996) argued that corporate governors may make decisions today, but the impact of those decisions on risk taking may be reflected in the future. Thus, our regression analysis included the time lag between corporate governance and risk.

The regression equations for life insurers are specified as follows:

$$\begin{aligned} RISK_i^j = & \beta_0 + \beta_1 CR_i + \beta_2 DEV_i + \beta_3 INSIDER_i + \beta_4 INSIDERSQ_i \\ & + \beta_5 BSIZE_i + \beta_6 BIND_i + \beta_7 DUAL_i + \beta_8 OWNCON_i \\ & + \beta_9 CAP_i + \beta_{10} HI_i + \beta_{11} RETURN_i + \beta_{12} SIZE_i \\ & + \beta_{13} Year\ 2000 + \beta_{14} Year\ 2001 + \varepsilon_i \end{aligned} \quad (1)$$

and those for property-liability insurers are:

$$\begin{aligned} RISK_i^j = & \beta_0 + \beta_1 CR_i + \beta_2 DEV_i + \beta_3 INSIDER_i + \beta_4 INSIDERSQ_i \\ & + \beta_5 BSIZE_i + \beta_6 BIND_i + \beta_7 DUAL_i + \beta_8 OWNCON_i \\ & + \beta_9 CAP_i + \beta_{10} HI_i + \beta_{11} RETURN_i + \beta_{12} SIZE_i \\ & + \beta_{13} REINS + \beta_{14} Year\ 2000 + \beta_{15} Year\ 2001 + \varepsilon_i \end{aligned} \quad (2)$$

where  $j = 1, 2,$  and  $3$ . Risk<sup>1</sup> equals business risk measured by the standard deviation of the log of underwriting income; Risk<sup>2</sup> equals investment risk, which is measured by the standard deviations of the proportion of stock investment in the total invested assets; and Risk<sup>3</sup> equals the standard deviations of ROE. Following Gorton and Rosen (1995) and Wright et al. (1996), we

<sup>14</sup> Two important variables—organizational form and distribution channel—do not appear in the regression model because there is no mutual insurer in Taiwan and insufficient information regarding different distribution channels in Taiwan.

examined whether the relationship between risk taking and the share of insider stock ownership is inversely U-shaped by including INSIDER and INSIDERSQ in the regression analysis, where INSIDER is the percentage of shares owned by the director and officers and INSIDERSQ is the square of INSIDER. We also included a cash-flow rights (CR) variable in the regressions, so that CR is the cash-flow rights held by controlling shareholders. As we stated previously, the deviation between voting rights and cash-flow rights (DEV) may influence a firm's risk taking. Following La Porta et al. (2002), Claessens, Djankov and Lang (2000) and Yeh (2005), we adopted two measures, including the difference between voting rights and cash-flow rights and the ratio of voting rights to cash-flow rights, to represent the magnitude of deviation between voting rights and cash-flow rights. We also distinguished the cash-flow rights held by the controlling shareholders from insider ownership. Because insiders mainly receive salary and/or bonus compensation, whereas the controlling shareholders generally receive benefits from their cash-flow rights, we examined the impact of the cash-flow rights of the controlling shareholder and the ownership of directors and officers on risk taking separately.

To determine whether the board plays an important role, we included four board composition variables—ownership concentration (OWNCON), board size (BSIZE), board independence (BIND), and CEO duality (DUAL)—that we deemed important for effective board monitoring in our regression. The OWNCON variable equals the percentage of shares owned by the first 10 largest stockholders; BSIZE is the number of members on the board; BIND is the board independence, which equals the percentage of outside directors among the board members; and DUAL is a CEO duality dummy, which equals 1 if the CEO also serves as the chairperson of the board and 0 otherwise.

We included the following control variables: the Herfindahl concentration index (HI), firm size (SIZE), and the capital-to-assets ratio (CAP). For the property-liability insurance industry, we also included the reinsurance ratio (REINS). HI is used to control for a possible influence of the line of business on risk taking by firms; SIZE is the natural log of total assets; CAP is the ratio of equity capital to total assets; and REINS is the ratio of reinsurance premiums ceded to the sum of the direct premiums written and reinsurance premiums. For each risk variable, we also employed a return control variable (RETURN). RETURN for business risk, investment risk, and ROE standard deviation are book values of ROE, ROA, and ROE, respectively.<sup>15</sup> Finally, we included Year 2000 and Year 2001 as year dummies.

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<sup>15</sup> We do not use the market value of ROE and ROA, because most insurers in Taiwan are not publicly-traded firms and data on market value are not available for most life and property-liability insurers.

## 5. Empirical Results

In Tables 1 and 2, we present the summary statistics of the variables in the regression analysis, including the risk taking and corporate governance variables for life insurers and property-liability insurers, respectively.

Our results indicate that insider ownership is approximately 63 percent for life insurers and 32 percent for property-liability insurers in Taiwan. Compared with the average of 10 percent in non-financial services firms (for example, Yermack 1996; Vafeas 1999), insider ownership among insurers in Taiwan is thus very high, especially in the life insurance industry. In addition, on average, 73.2 percent of voting rights belong to large shareholders among life insurers; this percentage is 60.4 for property-liability insurers. The cash-flow rights equate to 53.7 percent for life insurers and 36.6 percent for property-liability insurers. Thus, in contrast with the results in the previous literature (for example, La Porta, Lopez-de-Silanes and Shleifer 1999), both the voting rights and cash-flow rights variables are higher in the Taiwanese insurance industry. Finally, the ownership concentration ratio is 87.2 percent for life insurers and 72.9 percent for property-liability insurers; that is, ownership is more concentrated in the hands of the first 10 shareholders in the life insurance industry than in the property-liability insurance industry.

With regard to the board composition variables, our results show that there are, on average, 10–11 members on the boards, that is, fewer than the average of 12–14 members on the boards of non-insurance firms (for example, Changanti, Mahajan and Sharma 2007; Yermack 1996). Among these members, outsiders account for 12 percent of life insurer boards and 5.6 percent of property-liability insurer boards; whereas Yermack (1996) and Vafeas (1999) documented that the boards of non-financial services firms contain 52–56 percent outside directors. Thus, it appears that the board independence level for Taiwanese insurers is relatively low. The presence of CEO duality exists in both the life and property-liability insurance segments.

We performed a number of multiple regression analyses to examine the relationship between risk taking and corporate governance.<sup>16</sup> We report the estimated parameters of the regression models and the corresponding t-statistics for the life and property-liability insurance industries in Tables 3 and 4, respectively. In Table 3, Models (1) and (2) represent business risk; Models (3) and (4) are for investment risk; and Models (5) and (6) are for the standard deviations of ROE. We tested for multicollinearity using a variance inflation factor test and found that the assumptions of these regressions are not violated; the run test was also consistent with the hypothesis that no serial correlation exists at the 5 percent level in the estimated equation.

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<sup>16</sup> We also performed regression analysis using random effects models. The results of these models do not change the overall conclusions.

**Table 1**  
**Summary Statistics for Life Insurance Companies**

Variables	Mean	Std Dev	Minimum	Maximum
Business Risk	0.368	0.287	0.001	1.459
Investment risk	0.013	0.009	0.002	0.033
ROE Standard Deviation	0.398	0.587	0.019	3.579
Cash-Flow Rights	0.537	0.307	0.170	1.000
Voting Rights	0.732	0.264	0.296	1.000
Voting Rights – Cash-Flow Rights	0.195	0.216	-0.031	0.759
Voting Rights/Cash-Flow Rights	2.096	1.345	0.969	4.911
Board Size	10.192	4.919	4.000	24.000
Board Independence	0.120	0.198	0.000	0.250
CEO Duality	0.096	0.298	0.000	1.000
Insider Ownership	0.630	0.401	0.000	1.000
Ownership Concentration	0.872	0.198	0.210	1.000
Capital Ratio	0.069	0.044	0.008	0.213
Herfindahl Concentration Index	0.616	0.119	0.295	0.862
ROA	-0.004	0.025	-0.058	0.058
ROE	-0.273	0.398	-6.829	0.620
SIZE	17.347	1.752	13.862	20.975

Notes : Business risk = standard deviation of the log of underwriting income; Investment risk = standard deviation of the proportion of stock investment to total invested assets; Cash-flow rights = cash-flow rights held by controlling shareholders; Voting rights = voting rights held by controlling shareholders; Board size = number of members on the board; Board independence = percentage of outside directors among board members; CEO duality = dummy equal to 1 if the CEO also serves as the chairperson of the board and 0 otherwise; Insider ownership = percentage of shares owned by the director and officers; Ownership concentration = percentage of shares owned by the first 10 largest stockholders; Capital ratio = ratio of equity capital to total assets; Herfindahl Concentration Index = line concentration equal to the square sum of each firm's individual line of business to its total line of business based on premium income. SIZE = log of total assets.

**Table 2**  
**Summary Statistics for Property-Liability Insurance Companies**

Variables	Mean	Std Dev	Minimum	Maximum
Business Risk	0.385	0.472	0.025	1.503
Investment risk	0.021	0.015	0.005	0.069
ROE Standard Deviation	0.306	0.887	0.003	4.506
Cash-Flow Rights	0.366	0.312	0.015	1.000
Voting Rights	0.604	0.238	0.005	1.000
Voting Rights – Cash-Flow Rights	0.234	0.226	-0.091	0.789
Voting Rights/Cash-Flow Rights	3.700	4.637	0.906	19.704
Board Size	11.435	4.943	5.000	21.000
Board Independence	0.056	0.059	0.000	0.167
CEO Duality	0.063	0.245	0.000	1.000
Insider Ownership	0.323	0.455	0.000	1.000
Ownership Concentration	0.729	0.287	0.276	1.000
Capital Ratio	0.297	0.112	0.039	0.563
Herfindahl Concentration Index	0.537	0.130	0.361	0.978
ROA	0.024	0.012	0.0006	0.064
ROE	-0.010	0.306	-2.596	2.436
SIZE	22.897	0.729	21.838	25.070
Reinsurance Ratio	0.567	0.131	0.192	0.835

Notes : Business risk = standard deviation of the log of underwriting income; Investment risk = standard deviation of the proportion of stock investment to total invested assets; Cash-flow rights = cash-flow rights held by controlling shareholders; Voting rights = voting rights held by controlling shareholders; Board size = number of members on the board; Board independence = percentage of outside directors among board members; CEO duality = dummy that equals 1 if the CEO also serves as the chairperson of the board and 0 otherwise; Insider ownership = percentage of shares owned by the director and officers; Ownership concentration = percentage of shares owned by the first 10 largest stockholders; Capital ratio = ratio of equity capital to total assets; Herfindahl Concentration Index = line concentration that equals the square sum of each firm's individual line of business to its total line of business based on premium income; SIZE = log of total assets; Reinsurance ratio = ratio of reinsurance premiums to the sum of direct premiums written and reinsurance premiums.

From Table 3, we found that cash-flow rights have negative impacts on insurers' risk taking behavior in Model 5. The coefficients for cash-flow rights are significantly negative in relation to the standard deviation of ROE, consistent with the prediction that cash-flow rights provide a financial incentive for major shareholders to run the firm safely. Thus, the result rejects our first null hypothesis that no relationship exists between cash-flow rights in the hands of the controlling shareholder and risk taking.

The deviation between voting rights and cash-flow rights has a significantly positive impact on the ROE standard deviation in Model (6), leading to the rejection of our second hypothesis that the deviation between voting rights and cash-flow rights has no significant impact on risk taking. The evidence suggests that the controlling shareholders of insurance firms owning voting rights in excess of their cash-flow rights have an incentive to expropriate the interests of minority shareholders by shifting risk. However, we found that the coefficients of deviation between voting rights and cash-flow rights in Models (1) to (4) are insignificant. A possible reason for this result is that the effect of the deviation between voting rights and cash-flow rights on risk may be diminished or replaced by stricter regulation of the unlimited liability rule in Taiwan.

The relationship between risk and the share of insider stock ownership is inversely U-shaped in Models (3), (4) and (6) as previous studies predicted, rejecting our third hypothesis that insider ownership has no impact on risk taking. This evidence is consistent with that of Wright et al. (1996). Specifically, the coefficient for insider ownership is positive, whereas the coefficient for its square term is negative in the investment risk and ROE standard deviation equations. This indicates that the relationship between insider ownership and risk taking is inversely U-shaped. This result implies that insiders have more incentive to take risk at low levels of stock ownership; however, when the insiders' ownerships are beyond a certain point, they have a large undiversifiable stake in the firm and may avoid taking excessive risk.

Bigger boards and larger proportions of independent boards function more effectively in controlling business risk; CEO duality helps to control both business risk and investment risk. So, the evidence results in the rejection of our null hypotheses that no relationships exist between board size, board independence, and CEO/chairperson duality and risk taking. In addition, firm size, the capital ratio, and ownership concentration are significantly positively related to the ROE standard deviation. That is, big firms, firms with higher capital ratios, and firms whose ownership is more concentrated in the first ten large shareholders have higher profit volatilities.

We can also capture the effects of the return on risk in the ROA and ROE variables. The coefficient of ROA is significantly negative in the investment risk equation and the coefficient of ROE is significantly negative in the ROE standard deviation, which implies that insurers may take too much inappropriate or unnecessary risk and do not obtain enough benefits by way of reward in response

to the risk they take.

We present the regression results for property-liability insurance companies in Table 4. The coefficient on the deviation between voting rights and cash-flow rights is marginally positively significant (at the 10 percent level) in Model (3) of the investment risk equation, which is consistent with the relationship found for the life insurance industry in Table 3. The results suggest that the controlling shareholders of insurance firms holding voting rights in excess of their cash-flow rights have an incentive to expropriate the interests of minority shareholders by taking higher investment risk. The results lead to the rejection of our second null hypothesis that no relationship exists between the level of deviation between the voting rights and cash-flow rights of the controlling shareholder and risk taking. However, the evidence is weak since most coefficients on the deviation between voting rights and cash-flow rights are insignificant. As mentioned above, the possible reason for this result is that the effect of the deviation between voting rights and cash-flow rights on risk may be diminished or replaced by stricter regulation of the unlimited liability rule in Taiwan.

We next consider insider stock ownership. As in the case of the life insurance industry in Table 3, we found that the relationship between investment risk and the share of insider stock ownership is inversely U-shaped and thus our third null hypothesis that no relationship exists between insider ownership and risk taking does not receive support. This result implies that if insiders have ownership in the firm, their interests tie more closely with those of the stockholders, which induces higher risk taking. If insiders maintain ownership of the firm beyond a certain level, they would have less incentive to take extra risk.

We also found that board size, board independence, and the presence of a CEO duality relate negatively to risk taking. That is, bigger boards function more effectively in controlling ROE standard deviations; board independence and a dual CEO/chairperson help control investment risk and business risk, respectively, resulting in the rejection of our null hypotheses that board size, board independence, and CEO/chairperson duality have no impact on risk taking. However, the evidence must be regarded as weak due to the insignificant coefficients on these three variables in the other equations. We did not find ownership concentration or the capital ratio to have significant influences on risk taking for property-liability insurers.

**Table 3**  
**Regression Analysis of Risk of Life Insurance Companies**

Variables	Business Risk		Investment Risk		ROE Standard Deviation	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Intercept	0.575(1.88)*	0.684(2.34)**	-0.050(-1.11)	-0.029(-0.66)	-2.332(-2.98)***	-2.410(-4.53)***
CR	-0.062(-0.98)	-0.084(-0.74)	-0.002(-0.24)	-0.016(-1.19)	-0.392(-2.41)**	0.328(1.59)
VT-CR	0.119(0.98)		0.019(1.24)		-0.003(-0.01)	
VT/CR		0.004(0.13)		-0.002(-0.57)		0.208(3.96)***
INSIDER	0.265(1.13)	0.259(1.07)	0.070(2.35)**	0.055(1.86)*	0.955(1.60)	1.111(2.53)**
INSIDERSQ	-0.091(-0.48)	-0.060(-0.31)	-0.069(-2.58)**	-0.055(-2.16)**	-1.181(-2.41)**	-1.148(-3.25)***
BSIZE	-0.035(-3.93)***	-0.033(-3.60)***	-0.001(-1.09)	-0.001(-0.75)	-0.010(-0.43)	-0.028(-1.67)
BIND	-1.214(-1.82)*	-1.156(-1.45)	-0.005(-0.07)	0.021(0.29)	0.257(0.15)	-2.838(-1.96)*
DUAL	-0.238(-2.48)**	-0.241(-2.44)**	-0.026(-2.56)**	-0.023(-2.29)**	0.255(1.04)	0.213(1.19)
OWNCON	-0.028(-0.32)	-0.012(-0.11)	0.023(1.75)*	0.028(1.91)*	0.481(2.10)**	-0.052(-0.25)
CAP	-0.852(-1.88)*	-0.922(-2.01)*	-0.009(-1.59)	-0.009(-1.67)	2.640(2.28)**	2.920(3.49)***
HI	0.276(1.19)	0.170(0.76)	0.033(1.36)	0.017(0.75)	-0.578(-0.97)	0.108(0.26)
ROE	-0.035(-0.64)	-0.036(-0.63)			-1.906(-13.41)***	-1.834(-17.41)***
ROA			-0.656(-3.76)***	-0.670(-3.76)***		
SIZE	-0.002(-0.13)	-0.005(-0.37)	0.002(0.82)	0.002(0.70)	0.140(4.02)***	0.121(4.81)***
Year 2000	0.049(1.35)	0.045(1.19)	-0.001(-0.16)	-0.002(-0.45)	0.067(0.72)	0.099(1.46)
Year 2001	0.014(0.40)	0.017(0.47)	-0.004(-0.91)	-0.004(-0.79)	0.054(0.61)	0.017(0.25)
Adjusted R <sup>2</sup>	0.6490	0.6308	0.2831	0.2561	0.9039	0.9487

Notes: CR = cash-flow rights held by controlling shareholders; VT-CR = voting rights – cash-flow rights; VT/CR = voting rights/cash-flow rights; INSIDER = percentage of shares owned by the directors and officers; INSIDERSQ = square of insider ownership; BSIZE = number of board members; BIND = percentage of outside directors among the board members; DUAL = equals 1 if the CEO also serves as the chairperson of the board and 0 otherwise; OWNCON = percentage of shares owned by the first 10 largest stockholders; CAP = ratio of equity capital to total assets; HI = line concentration equal to the square sum of each firm's individual line of business to its total line of business based on the premium income; ROE = return on equity; ROA = return on total assets; SIZE = log of total assets. The values in parentheses represent t-statistics. \*\*\*Statistically significantly different at the 1% level or better. \*\* Statistically significantly different at the 5% level. \* Statistically significantly different at the 10% level.

**Table 4**  
**Regression Analysis of Risk of Property-Liability Insurance Companies**

Variable	Business Risk		Investment Risk		ROE Standard Deviation	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Intercept	0.952(1.09)	0.945(0.89)	0.276(1.70)	0.370(1.72)	4.512(1.68)	6.932(2.11)*
CR	0.065(0.35)	0.020(0.08)	0.058(1.58)	0.009(0.17)	0.970(1.66)	0.028(0.04)
VT-CR	0.312(1.07)		0.117(2.09)*		1.261(1.40)	
VT/CR		0.024(0.31)		-0.004(-0.25)		-0.223(-0.92)
INSIDER	-17.813(-0.24)	-40.035(-0.54)	39.075(2.54)**	29.045(1.77)*	391.968(1.68)	281.457(1.22)
INSIDERSQ	18.079(0.24)	40.196(0.54)	-38.932(-2.54)**	-28.945(-1.77)*	-389.627(-1.68)	-279.504(-1.22)
BSIZE	-0.014(-0.66)	-0.011(-0.50)	-0.006(-1.56)	-0.005(-1.03)	-0.161(-2.49)**	-0.141(-2.13)**
BIND	-0.889(-0.33)	-0.239(-0.09)	-1.205(-2.22)**	-1.005(-1.64)	-16.166(-1.95)	-15.473(-1.82)*
DUAL	-0.431(-2.51)**	-0.451(-2.48)**	0.062(0.86)	0.037(0.46)	0.346(0.65)	0.039(0.07)
OWNCON	-0.474(-0.73)	-0.341(-0.52)	-0.150(-1.19)	-0.072(-0.52)	-3.370(-1.68)	-2.319(-1.14)
CAP	0.155(0.17)	0.295(0.30)	-0.202(-1.13)	-0.093(-0.44)	-0.016(-0.01)	0.704(0.23)
HI	-0.091(-0.19)	-0.141(-0.22)	-0.056(-0.60)	-0.151(-1.08)	-1.287(-0.45)	-2.518(-1.24)
ROE	0.084(1.04)	0.092(1.05)			-0.438(-0.29)	1.381(5.11)***
ROA			-0.045(-0.13)	-0.087(-0.20)		
SIZE	0.023(0.48)	0.019(0.37)	0.000(-0.02)	-0.004(-0.39)	1.455(5.80)***	-0.120(-0.78)
REINS	0.220(0.61)	0.255(0.68)	-0.129(-1.86)	-0.100(-1.24)	-0.016(-0.01)	0.515(0.44)
Year 2000	-0.902(-9.35)***	-0.930(-8.42)***	0.032(1.74)*	0.010(0.48)	0.488(1.63)	0.099(0.29)
Year 2001	-0.867(-9.40)***	-0.893(-9.18)***	0.031(1.74)*	0.014(0.69)	0.513(1.80)*	0.234(0.78)
Adjusted R <sup>2</sup>	0.8680	0.8603	0.221	0.0245	0.6940	0.6744

Notes: CR = cash-flow rights held by controlling shareholders; VT-CR = voting rights – cash-flow rights; VT/CR = voting rights/cash-flow rights; INSIDER = percentage of shares owned by the directors and officers; INSIDERSQ = square of insider ownership; BSIZE = number of board members; BIND = percentage of outside directors among the board members; DUAL = equals 1 if the CEO also serves as the chairperson of the board and 0 otherwise; OWNCON = percentage of shares owned by the first 10 largest stockholders; CAP = ratio of equity capital to total assets; HI = line concentration equal to the square sum of each firm's individual line of business to its total line of business based on the premium income; ROE = return on equity; ROA = return on total assets; SIZE = log of total assets; REINS = the ratio of reinsurance premiums ceded to the sum of the direct premiums written and reinsurance premiums. The values in parentheses represent t-statistics. \*\*\*Statistically significantly different at the 1% level or better. \*\* Statistically significantly different at the 5% level. \* Statistically significantly different at the 10% level.

We summarize and compare the empirical regression results for life and property-liability insurance companies in Table 5. Consistent with the prior literature, we found that for both types of insurance companies, the impact of the deviation between voting rights and cash-flow rights on risk taking are significantly positive; the influences of board size, board independence and CEO duality on risk taking are significantly negative. In addition, the relationship between investment risk taking and insider ownership is inversely U-shaped. Therefore, the findings suggest that some of the corporate governance mechanisms could help to prevent insurance firms from engaging in excessive risk taking. However, the evidence should be interpreted with caution because some coefficients on these variables are not statistically significant. Thus, the results imply that a stricter liability constraint may reduce or replace the effect of some corporate governance factors on the insurers' risk taking behavior.

In addition, the results from Table 3 and 4 indicate that compared with the results for property-liability insurance companies, corporate governance variables have a greater impact on the risk taking behavior of life insurance companies. There are two possible reasons why corporate governance has a more significant effect on the risk taking behavior of life insurance companies.

First, the differences in business practices between life and property-liability segments of the insurance industry may lead to different effects of corporate governance on risk taking. For example, the underwriting policies, pricing, and service complicity are more difficult to control in the property-liability industry, and thus the business practices in the property-liability insurance industry require greater managerial decision-making authority. The increased discretion may allow managers to act opportunistically and the corporate mechanisms for monitoring risk taking may not perform as they should. On the other hand, for life insurers, because life insurance products and services are less complicated and firms grant managers less discretion in decision making, corporate mechanisms for risk control may be more likely to control the managerial opportunism. Accordingly, corporate governance variables have greater monitoring and controlling effects on the risk taking of life insurance companies than on that of property-liability insurance companies. Second, life insurers have more highly-leveraged equity and exposure positions than property-liability insurers. Thus, life insurers bear higher solvency liabilities and corporate governance variables have a greater impact in terms of discouraging the risk taking behavior of life insurance companies in order to avoid the insolvency problem.

**Table 5**  
**Summary of Empirical Results**

Corporate Governance Variables	Empirical Results					
	Business Risk		Investment Risk		ROE Standard Deviation	
	Life	P-L	Life	P-L	Life	P-L
CR					—	
VT-CR or VT/CR				+	+	
INSIDER			+	+	+	
INSIDERSQ			—	—	—	
BSIZE	—					—
BIND	—			—	—	—
DUAL	—	—	—			

Notes: Business risk = standard deviation of the log of underwriting income; Investment risk = standard deviation of stock investment holdings; ROE standard deviation = standard deviations of returns on equity; CR = cash-flow rights held by controlling shareholders; VT-CR = voting rights – cash-flow rights; VT/CR = voting rights/cash-flow rights; INSIDER = percentage of shares owned by the director and officers; INSIDERSQ = square of insider ownership; BSIZE = number of members on the board; BIND = percentage of outside directors among board members; DUAL = equal to 1 if the CEO also serves as the chairperson of the board and 0 otherwise.

+ Positive and significant at the 10% level or less.

— Negative and significant at the 10% level or less.

## 6. Conclusions

This paper investigates the impacts of corporate governance structures on risk taking in the insurance industry. Our study extends the existing literature on corporate governance on two fronts. First, the corporate governance system of the insurance industry in Taiwan, which holds board members and managers fully responsible for bankruptcy, offers an interesting environment in which to explore its unique regulatory impact on insurers' risk taking behavior. Second, Taiwanese insurance firms are primarily family-controlled, with a high degree of ownership concentration. Against such an ownership structure background, corporate governance mechanisms are more important as a means of prohibiting possible misconduct by controlling shareholders, especially in the insurance industry, where insurers use their great financial leverage to conduct business. To our knowledge, ours is the first study to examine the effects of voting rights and cash-flow rights ownership on insurers' risk taking behavior in the insurance industry.

In general, our results provide evidence in support of the claim that the corporate governance structure plays an important role in influencing the insurers' risk taking behavior even under stricter regulatory rules. Consistent with prior literature, we find that deviations between voting rights and cash-flow rights have positive impacts on profit risk for life insurers and on investment risk for property-liability insurers. However, the evidence should be interpreted with caution because some coefficients on these variables which were statistically significant in the earlier studies are not statistically significant in this study. Thus, the results imply that the stricter liability constraint may discourage insurers' risk taking behavior or may reduce/replace the effect of some corporate governance factors on insurers' risk taking behavior. This result is consistent with the results of Saunders, Strock and Travols (1990) and Esty (1998).

The relationship between investment risk and insider ownership is inversely U-shaped in both segments of the insurance industry. Furthermore, for life insurance, board independence and board size are negatively related to business risk; CEO duality is negatively related to investment risk, and higher cash flow rights and board independence may discourage profit risk. Among property-liability insurance firms, CEO duality, board independence, and board size also have negative impacts on the different risks of insurers. In particular, CEO duality is negatively related to business risk; the relationship between investment risk and board independence is negative, and board independence and board size have a negative impact on profit risk.

Additional findings suggest that, compared to property-liability insurance companies, corporate governance variables have a greater impact on the risk taking behavior of the life insurance industry. The empirical results seem to further imply that the differences in business practices between these two segments of the insurance industry may lead to different impacts on risk taking. In addition, compared to the property-liability insurers, life insurers have higher leveraged equity and

exposure positions. Thus, life insurers bear higher liabilities and greater solvency risk. As a result, the corporate governance variables may have a greater impact in terms of discouraging the risk taking behavior of life insurance companies to avoid the insolvency problem.

The implication of our findings is that some of the corporate governance mechanisms have real and predictable effects on the monitoring of risk taking by insurance firms. In addition, our evidence shows that the stricter liability rule, which holds board members and managers fully responsible for cases involving bankruptcy, does not effectively discourage risk taking as a whole. Insurance regulators, however, may minimize excessive risk taking through alternative means, such as higher minimum capital requirements, stricter risk-based capital rules, or prompt disclosure regarding improper transactions.

The analysis of this paper suggests several avenues for future research. First, our findings imply that a stricter liability constraint may reduce/replace the effect of some corporate governance factors on insurers' risk taking behavior. Whether the unlimited liability rule has a negative effect on the insurers' risk taking deserves further study. The second potential avenue for future research is to examine whether different insurance regulations have different effects on insurers' risk taking behavior. For example, the risk-based capital (RBC) regulation and the investment restriction in Taiwan may discourage risk taking by insurance firms. Thus, a comparison of insurers' risk taking behavior among different insurance regulations would provide more insights into this issue. We also encourage additional studies to examine whether poor corporate mechanisms increase the probabilities of financial distress or bankruptcy by using different proxies to measure risk in the insurance industry. Finally, the mandatory risk-based capital system of 2003 should have an impact on the insurer's risk taking behavior. Thus, this issue might receive additional scrutiny using data after 2003. In this paper, we only focus on the time period from 2000 through 2002. The RBC requirements may encourage some weak insurers to limit their risk taking or increase their capital. As a result, it would be noteworthy to examine the relationship between corporate governance and risk taking after the adoption of the RBC system.

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