

Return to Basics: An Empirical Legal Study on Directors' and Officers' (D&O) Liability Insurance and Litigation Risk in Taiwan

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CONFERENCE DRAFT

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This paper empirically analyzes the functions of directors' and officers' (D&O) liability insurance in corporate governance in Taiwan, also reexamining the fundamental issue—litigation risk of directors and officers. This research argues that litigation risk of directors, which is critically related to the fundamental function of insurance about indemnity, should be clarified before any legal revolution. This paper starts with examining if the demand and functions of D&O insurance are influenced by directors' and officers' litigation risk. The monitoring hypothesis suggests that firms with weak corporate governance have a greater incentive to purchase D&O insurance. Intuitively, firms with higher litigation risks are intended to purchase more insurance. Meanwhile, D&O insurance and other monitoring mechanisms are substitutes for each other. Firms which have better corporate governance have less demand for D&O insurance. However, after empirically examining D&O insurance purchases and relevant litigations in Taiwan from 2008 to 2014, it is found that the monitoring hypothesis is not supported. The second part of this research moves on the detailed empirical test of signal effect of D&O insurance and finds the hypothesis is supported. Considering risking behavior after insurance purchase may affect the functions of insurance, the third part analyzes possible opportunistic behavior caused by D&O insurance. It is found that the evidence about opportunistic behavior is not significant. Based on these findings, the paper further argues that it is not necessary to mandate D&O insurance in Taiwan. The findings of this paper are also helpful for other Asian countries, where the issue about D&O insurance and liability risk is emerging.

Keywords: D&O insurance, corporate governance, monitoring hypothesis, signal hypothesis, Ohlson model, opportunistic behavior, moral hazard

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I. Introduction

A. Research background

Directors' and officers' (D&O) liability insurance is an agreement to indemnify corporate directors and officers against judgments, settlements, and fines arising from negligence suits, shareholder actions, and other business-related lawsuits¹. D&O insurance is a type of liability insurance whose primary purpose is to compensate for the losses experienced by directors and officers when specific legal liabilities arise. D&O insurance may also serve the function of monitoring the governance of companies. For example, when underwriting is in progress, insurers may examine the financial status of insured companies, which will allow outside investors to understand more about the financial situation of company. D&O insurance can both transfer risk and offer incentives for insured companies to improve their corporate governance. After the problems experienced by Enron, Worldcom and other companies in various financial crises, the monitoring function of D&O insurance has been discussed more frequently, particularly in common law. Given this tendency², discussions of this issue have become more popular in Taiwan³. Many proponents even argue that D&O insurance should be more promoted or mandated.

Exploring this issue in Taiwan should be meaningful and worthwhile, because of its special background and relationship to the D&O insurance issue. Taiwan primarily follows a civil law tradition,⁴ but private laws of it are also affected by common law.⁵ D&O insurance originated in, and was developed in, common law countries, including the United Kingdom, the United States and Canada. Most companies in the US purchase D&O insurance. This research will examine the function of D&O insurance in corporate governance in the context of civil law countries.

The general development of the insurance industry in Taiwan is significant. The first D&O insurance policy was issued in 1997, and the percentage of listed companies that purchase D&O insurance is approximately 50% to date. The D&O insurance industry developed in a stable manner in Taiwan. The first issued D&O insurance policies were issued in Taiwan in 1997 and 60% of listed companies are currently insured by D&O. This is lower than in the United States, Canada and United Kingdom, but higher than

¹ See Black's Law Dictionary (9th ed. 2009).

² After Enron and WorldCom scandals, reforms of the Sarbanes-Oxley and New York Stock Exchange Listing standards, the 1997-98 financial crisis in Asia had a similar effect on Taiwan. See Ronald J. Gilson & Curtis J. Milhaupt, *Choice as Regulatory Reform: The Case of Japanese Corporate Governance*, 53 AM. J. COMP. L. 343, 343 (2005). More discussion about financial crisis in Taiwan, see Lawrence L. C. Lee, *Taiwan's Current Banking Development Strategy: Preparing for Internationalization by Preventing Insider Lending*, 17 UCLA PAC. BASIN L.J. 166, 206 (Fall 1999/Spring 2000).

³ This can be found by prospering relevant researches, such as: Jui-I Chang, *ESSAYS ON DIRECTORS' AND OFFICERS' LIABILITY INSURANCE AND FIRM BEHAVIOR*, Ph.D. Dissertation of National Chengchi University (2009). Tsai-Jyh Chen & Chia-Hui Pang, *An Analysis of Determinants of the Corporate Demand for Directors' and Officers' Liability Insurance*, 18:2 NTU MGMT. REV 171 (2008).

⁴ See Michael M. Hickman, *Protecting Intellectual Property in Taiwan — Non-Recognized United States Corporations and Their Treaty Right of Access to Courts*, 60 WASH. L. REV. 117, 119 (1984).

⁵ See Andrew Jen-Guang Lin, *Common Law Influences in Private Law - Taiwan's Experiences Related to Corporate Law*, 4 NAT'L TAIWAN U. L. REV. 107, 132 (2009).

China.⁶ In Taiwan, according to the articles of incorporation or resolution adopted in the shareholders' meeting, a TSEC/GTSM listed corporation may take out liability insurance for directors with respect to their liabilities resulting from exercising their duties during their terms of occupancy.⁷ It is important to observe the development of D&O insurance and its monitoring function with respect to the background of Taiwan.

This study attempts to analyze the role of D&O insurance in corporate governance in Taiwan. What will be discussed here includes the monitoring hypothesis, signal hypothesis, the attributes and problems of corporate governance in Taiwan, the differences between common law and civil law, and the function that D&O insurance serves in Taiwan. This paper proposes that the purchase of D&O insurance is roughly and positively related to the corporate governance of insured companies in Taiwan. Even given that the industry is not as well developed as is the case the United States, the positive relationship still can be observed. Conversely, the reason why a difference exists between Taiwan and the United States can be explained by the attributes of the conditions in Taiwan, such as the design of corporate governance structures, the prevalence of D&O insurance, the development of the litigation system and so on. In addition to the rejection of monitoring hypothesis, the signal hypothesis that D&O insurance can emit positive signal is proposed and tested in this dissertation. By a series of empirical tests, sufficient evidence will be offered to establish signal theory.

B. Research process

This study begins with an introduction of the research background, hypothesis development, and methodology. Afterwards, rival theories regarding the purpose of director and officer insurance are introduced and discussed. Previous literature concerning D&O insurance and corporate governance will be reviewed, and arguments for and against it will be presented. Then, this dissertation will develop an alternative hypothesis to the monitoring hypothesis, which is a signal hypothesis. The monitoring hypothesis and the signal hypothesis are two main arguments which will be tested in this study. This provides the background for the following hypothesis development and empirical tests. Afterwards, a series of empirical tests will be carried out to examine the monitoring hypothesis and the signal hypothesis. This dissertation proposes that D&O insurance is an index for corporate governance and can emit positive signals to the market. Firms in Taiwan could purchase D&O insurance to increase their reputation and even attract more investment. However, D&O insurance does not have a monitoring function and the quality of corporate governance is not inversely related to the demand for D&O insurance. Thus, the monitoring hypothesis is rejected and the signal hypothesis is supported. Because the monitoring function of D&O insurance may be affected by exogenous factors, like moral hazard and opportunistic behavior, this study will clarify these concerns after the test for the monitoring hypothesis. This research proposes that there is no moral hazard problem in the Taiwanese market. Hence, D&O insurance does not imply the problem of opportunism and moral hazard, and the reasoning of the monitoring function would not be affected. Similarly, this study also hypothesizes that

⁶ This can be obtained in the website of Taiwan Financial Supervisory Commission, http://www.fscey.gov.tw/Layout/main_en/AllInOne_Show.aspx?path=1871&guid=5da0af18-fb31-4ffb-8dfc-05c37d3d0d0e&lang=en-us (last visited Jul. 31, 2015).

⁷ Corporate Governance Best-Practice Principles for TSEC/GTSM Listed Companies art. 39 (2006).

transaction bargaining and underwriting function well, there is no problem of asymmetric information or adverse selection, and the market is close to being homogenous.

In conclusion, this study will explore theories of D&O insurance and structures of corporate governance in Taiwan in detail. The monitoring and signal hypotheses will be developed by examining the differences between the United States and Taiwan, reviewing relevant literature and conducting analyses using a comparative viewpoint. Then, this study will test the proposed hypotheses by theoretical and empirical methods, and propose optimal suggestions for D&O insurance and corporate governance systems in Taiwan.

C. Empirical methodology

This dissertation will collect empirical data of D&O insurance and corporate governance in Taiwan, and test the proposed hypotheses by empirical methods. The data used in this study is obtained from databases or websites below: Taiwan Economic Journal (TEJ),⁸ Taiwan Stock Exchange Corp.,⁹ Market Observation Post System (MOPS),¹⁰ Financial Supervisory Commission, Executive Yuan, R.O.C.,¹¹ Taiwan Insurance Institute,¹² and Securities and Futures Investors Protection Center.¹³ This study will empirically analyze the purchase of D&O insurance by public companies in Taiwan during 2008 to 2014. Data about all public companies will be collected. Relevant arguments discussed in this research include whether or not the purchase of D&O insurance is positively related to the corporate governance of the insured companies, and whether D&O insurance have monitoring or signaling effect or not. A series of empirical works will be processed to test these hypotheses. Finally, this dissertation will synthesize the results of these methods and propose suggestions.

II. Monitoring effect of D&O insurance, corporate governance, and litigation risk

A. Rival Theories of the Purpose of Director & Officer Insurance

1. Monitoring Hypothesis

The difference between other outside monitors, such as credit rating agencies and auditors, is that insurers will suffer from the insured loss directly if the damage occurs. Hence, insurers have more incentive than other monitors to watch out for the quality of insured companies.¹⁴ Similarly, because D&O insurance is quite competitive, insurers

⁸ Taiwan Economic Journal, <http://www.finasia.biz/ensite/> (last visited Jul. 31, 2015).

⁹ Taiwan Stock Exchange Corp., <http://www.twse.com.tw/ch/index.php> (last visited Jul. 31, 2015).

¹⁰ Market Observation Post System, http://emops.tse.com.tw/emops_all.htm (last visited Jul. 31, 2015).

¹¹ Financial Supervisory Commission, Executive Yuan, http://www.fscey.gov.tw/Layout/main_ch/index.aspx?frame=1 (last visited Jul. 31, 2015).

¹² Taiwan Insurance Institute, <http://www.tii.org.tw/> (last visited Jul. 31, 2015).

¹³ Securities and Futures Investors Protection Center, <http://www.sfiipc.org.tw/english/main.asp> (last visited Jul. 31, 2015).

¹⁴ Lea H. Stern & M. Martin Boyer, *Is Corporate Governance Risk Valued? Evidence from Directors' and Officers' Insurance*, 29 (Sept. 15 2011), available at <http://ssrn.com/abstract=1571752>.

have to more carefully and seriously scrutinize the insured firms.¹⁵ In addition, insurers can use insurance clauses, obligations of disclosure and exclusions to control the insured risk and encourage the insured to mitigate risk.¹⁶ In other words, insurers in Taiwan can use the regulations in Insurance Law to increase monitoring function. After considering the proposal of Clifford G. Holderness, in which the monitoring function of D&O insurance has three dimensions,¹⁷ the monitoring function of D&O insurance in Taiwan is analyzed in similar approach. First, before a policy is issued, the insurer will investigate the factors which affect exposure. This information is critical for the determination of premiums. Corporate governance issues of the insured affect both the potential legal risks of the insured and the indemnification liability of the insurer. In addition, the monitoring function is also revealed in policy coverage, and the conditions and duration of litigation¹⁸. Given the possibility of being forced to pay compensation, insurers have substantial incentives to monitor the status of the insured and prevent the occurrence of losses. Hence, the corporate governance of the insured will be monitored.

However, some researchers argue against the monitoring hypothesis and the positive relationship between the purchase of D&O insurance and corporate governance. Tom Baker and Sean J. Griffith found that what underwriters are concerned about are “deep governance” variables such as culture and character, variables which are not confined to the financial analysis of the insured companies¹⁹. Moreover, the advice given by insurers is usually ignored by insured companies²⁰. Joshua Dobiac proposed that the governance role of D&O insurance is minor and whatever effect poor governance has on pricing is not adequate to change corporate behavior²¹. Boyer and Delvaux-Derome conclude that firms with weak governance systems facilitate opportunistic behavior and are likely to buy D&O insurance²². This means that the positive relationship between the purchase of D&O insurance and corporate governance of the insured companies is questionable.

2. Proposal of signal hypothesis

Different from previous arguments, this paper proposes an alternative hypothesis, the signal hypothesis, to the monitoring hypothesis. The argument is that D&O insurance has a significant effect in signal transmission. In addition to indemnification, the signal effect is another important consideration in insurance purchase. Signal effect aside, other

¹⁵ *Id.*

¹⁶ Wallace Wang, *The Relationship between the Deterrence Effect of D&O Insurance and Corporate Governance*, 156 TAIWAN L. REV. 141, 150-1 (2008).

¹⁷ See Clifford G. Holderness, *Liability Insurers as Corporate Monitors*, 10 INT'L REV. L. & ECON. 115, 118-20 (1990).

¹⁸ *Id.*

¹⁹ See Tom Baker & Sean Griffith, *Predicting Corporate Governance Risk: Evidence from the Directors' & Officers' Liability Insurance Market*, 74 U. CHI. L. REV. 487, 543 (2007).

²⁰ See Tom Baker & Sean Griffith, *The Missing Monitor in Corporate Governance: The Directors' and Officers' Liability Insurer*, 95 GEO. L.J. 1795, 1808-12 (2007).

²¹ See Joshua Dobiac, *I Came, I Saw, I Underwrote: D & O Liability Insurance's Past Underwriting Practices and Potential Future Directions*, 14 CONN. INS. L.J. 487, 508 (2008).

²² See M. Martin Boyer & Mathieu Delvaux-Derome, *The Demand for Directors' and Officers' Insurance in Canada* (2002), available at <http://ideas.repec.org/p/cir/cirwor/2002s-72.html>.

functions of D&O insurance are disputable; this is especially true regarding monitoring function. D&O insurance is not a component of the monitoring mechanism for firms, and its monitoring function is limited. The argument for the monitoring hypothesis that states that firms with poor corporate governance will have more demand for D&O insurance is not sustainable.

B. Research design

1. Variables

(a) D&O insurance

The purpose of this paper is to test whether or not there is a relationship between purchases of D&O insurance and the corporate governance of the insured companies. In this model, the dependent variable is whether or not the listed companies purchased D&O insurance. The variable *Purchase* is a dummy variable which denotes whether or not companies purchased D&O insurance. This equals 1 if companies purchased D&O insurance and 0 if they did not. The amount of D&O insurance coverage is the dependent variable for another panel. Insurance coverage indicates how much insurers must indemnify insured companies when losses take place. The variable *Coverage* denotes how much coverage a company purchased. Individual coverage of every firm is calculated respectively. If a company had more than one policy, the sum of all of that company's coverage was calculated. If a company simultaneously purchased insurance for individual directors and the entire board of directors, all of that coverage was combined as well.

(b) Business structure

A company's industry is an important consideration in assessing its corporate governance.²³ The industry of a company may affect its tentative litigation risk. Especially in Taiwan, it is believed that high-technology companies have more litigation risk²⁴ and have more demand for D&O insurance. Hence, the variable *Industry* is used to denote the industry group to which the companies belong. This paper defines "Semiconductor Industry," "Computer and Peripheral Equipment Industry," "Optoelectronic Industry," "Communications and Internet Industry," and "Electronic Parts/Components Industry" as high-technology companies and grant them the value "1." Other groups, which are not high-technology companies, are defined with the value "0." The variable *Industry* is a dummy variable.

(c) Financial performance

Litigation risk of firms may be related to their financial performance. The firms with poor financial performance may have more demand for D&O insurance. Regarding this, a firm's return of equity is usually used as proxy of financial performance.²⁵ It is expected

²³ 1849 PLI/Corp 453.

²⁴ *Id.* at 178.

²⁵ See John E. Core, *The Directors' and Officers' Insurance Premium: An Outside Assessment of the Quality of Corporate Governance*, 16 J.L. ECON. & ORG. 449, 462 (2000).

that this will be negatively related to the demand of D&O insurance.²⁶ *ROE* is used in this paper to indicate the financial performance of the listed companies during 2008 in Taiwan. All of this information was obtained from the Taiwan Economic Journal (TEJ).²⁷

(d) Corporate governance

There are several variables used to indicate the quality of corporate governance. Ownership structure and inter risk are important issues regarding corporate governance. When insiders' control over firms increases, the preference of outside shareholders may be ignored and the demand for insurance may increase.²⁸ Actually, D&O insurance applicants are typically asked to disclose the information about insider ownership and significant outside blockholdings.²⁹ So two variables are set up to test this factor. The variables *Sdirector* indicates the number of shares held by directors. The variable *Ctrldirector* indicates the number of directors nominated or controlled by the parent company or the largest controlling group within the company, such as family members, relatives, or the parent company.

As mentioned above, D&O insurance may be considered an important part of compensation packages for managers³⁰ and directors, especially for outside directors, as they often will not serve unless the package meets their reservation utility.³¹ By this reasoning, the compensation for directors and officers and D&O insurance are substitutes and are negatively related. However, there is an opposite argument, which proposes that the evidence to support this reasoning cannot be found.³² A different possible reasoning is that more compensation implies more liability for directors and officers, and thus there is more demand for D&O insurance.³³ By this reasoning, compensation and D&O insurance are positively related. In order to clarify this problem, the variable *Remuneration* is set to indicate the compensation package offered to the directors of each listed company.

An independent or outside director is usually viewed as an important mechanism for corporate governance. The more independent directors, the more closely the firms are overseen.³⁴ Possible mistakes may be prevented via this mechanism. In this way, litigation risk will be decreased and thus the demand for D&O insurance will also decrease.³⁵ The monitoring hypothesis can also suggest this reasoning. For the purpose of improving corporate governance, D&O insurance and other mechanisms, such as an independent director, are substitutes and therefore they are negatively related. However, M. Martin Boyer proposes a different argument, which is the risk aversion hypothesis.

²⁶ *Id.*

²⁷ See <http://www.tej.com.tw/twsite/>, (last visited Jul. 31, 2015).

²⁸ See John E. Core, *On the Corporate Demand for Director' and Officers' Insurance*, 64 J. RISK & INS. 63, 68 (1997).

²⁹ Tom Baker & Sean Griffith, *Predicting Corporate Governance Risk: Evidence from the Directors' & Officers' Liability Insurance Market*, 74 U. CHI. L. REV. 487, 522 (2007).

³⁰ See Boyer & Delvaux-Derome, *supra* note 22.

³¹ See Core, *supra* note 28, at 73.

³² *Id.* at 84.

³³ See Chen & Pang, *supra* note 3, at 179.

³⁴ See Boyer & Delvaux-Derome, *supra* note 22. However, the function of independent director is also arguable, see Victor Brudney, *The Independent Director— Heavenly City or Potemkin Village?*, 95 HARV. L. REV. 597, 611 (1982).

³⁵ *Id.*

Compared to inside directors, independent directors receive less compensation and fewer benefits from firms, and, as such, they usually request more D&O insurance coverage.³⁶ The number of independent directors is positively associated with D&O insurance. In order to evaluate this factor, the variables *Indpdirector* and *Auditcomitee* is used to indicate the number of independent directors and members of auditing committee in each listed company. Additionally, the dummy variable *Dual* equals 1 if the chairman of the board of directors is also the CEO, and is otherwise 0.

(e) Litigation risk

The main purpose of D&O insurance is to cancel out litigation risk. A high number of prior litigations may indicate bad corporate governance of firms. Under this reasoning, prior litigation may cause D&O claim or negative reputational effect. This may be positively related with the demand for D&O insurance.³⁷ The variable *Litigation* is to indicate the number of litigations that are significant and are disclosed by law.³⁸ If the number of litigations is in a positive relationship with the demand of D&O insurance, then monitoring the hypothesis is supported; otherwise, it is not.

Similarly, debt-asset ratio indicates firms' tentative financial problems. Firms with higher debt-asset ratios are usually in worse financial situations and thus have more risk of litigation.³⁹ Therefore, the variable *DARatio* indicates the debt-asset ratio of each listed company during 2008-2014. In sum, all of the variables and their descriptions are provided in Table 1.

Table 1 Table of variables

Variables	Definition
<i>Coverage Purchase</i>	The total coverage companies purchased Dummy variable. This equals 1 if companies purchase D&O insurance and 0 otherwise.
<i>Industry</i>	Dummy variable. This equals 1 if companies are high technology industry and 0 otherwise.
<i>ROE</i>	Return on equity of companies
<i>Remuneration</i>	The total of compensation package offered to directors
<i>Indpdirector</i>	The total number of independent directors
<i>Sdirector</i>	The percentage of shares held by directors (%)
<i>Ctrldirector</i>	Controlled directors. This indicates the number of directors who are nominated or controlled by the largest controlling group of the company, such as family, relatives, or parent company.
<i>Dual</i>	Dummy variable. This equals 1 if chairman of board of directors is identical to CEO and 0 otherwise.
<i>DARatio</i>	Debt-asset ratio of firms
<i>Litigation</i>	The number of disclosed significant litigation of firms

³⁶ See M. Martin Boyer, *Directors' and Officers' Insurance and Shareholder Protection*, 10 (March 2005), available at <http://ssrn.com/abstract=886504>.

³⁷ See Core, *supra* note 25, at 462.

³⁸ Securities and Exchange Act (Amended 24. Sept. 2010) Article 36 section 2.

³⁹ See Chen & Pang, *supra* note 3, at 178.

<i>lnmv</i>	Natural logarithm of market value of firms.
<i>bv</i>	Book value of firms
<i>EPS</i>	Earnings per share of firms
<i>S_ROE</i>	Standard deviation of ROE
<i>S_ROA</i>	Standard deviation of ROA
<i>S_EPS</i>	Standard deviation of EPS
<i>S_DAratio</i>	Standard deviation of debt-asset ratio
<i>S_Sti</i>	Standard deviation of short-term investment

2. Methods

This paper follows Clifford G. Holderness's approach in descriptive statistics.⁴⁰ This type of analysis is helpful in understanding the attributes of the types of companies that purchase D&O insurance and the companies that do not. Also, this research generally follows the regression analysis applied in many previous researches, like models developed by O'Sullivan⁴¹, M. Martin Boyer⁴² and Core⁴³. They use OLS regressions when the dependent variable, which is numeric value, is the limit of policy, and use logistic, which is binary, when the dependent variable is whether D&O insurance was purchased or not.⁴⁴ Thus, regression with panel data and robust standard errors are applied here. In model (1), the dependent variable is a binominal variable regarding whether or not firms purchase D&O insurance. This model is to test how D&O insurance purchase behavior relates to firms' governance and whether D&O insurance purchase behavior is a signal for corporate governance and thus whether monitoring function can be exerted. Because the dependent variable is binary, logistic regression is applied in this section.⁴⁵ Afterwards, insurance purchase is substituted with coverage in dependent variable in mode (2), to test the correlation between insurance coverage and previous variables. The regression models are shown in equations below. The statistical software package used is SPSS and STATA.⁴⁶

$$Purchase = \alpha + \beta_2 Industry + \beta_3 ROE + \beta_3 Remuneration + \beta_3 Indpdirector + \beta_3 Sdirector + \beta_3 Ctrldirector + \beta_3 Dual + \beta_3 DAratio + \beta_3 Litigation + \varepsilon \quad (1)$$

⁴⁰ See Holderness, *supra* note 17, at 123-24.

⁴¹ See Noel O'Sullivan, *Insuring the Agents: The role of directors' and officers' insurance in corporate governance*, 64 J. RISK & INS. 545, 554 (1997).

⁴² See M. Martin Boyer, *Is the Demand for Corporate Insurance a Habit? Evidence of Organizational Inertia from Directors' and Officers' Insurance*, 13 (2004). CIRANO - Scientific Publications 2004s-33, available at <http://ideas.repec.org/p/cir/cirwor/2004s-33.html>.

⁴³ See Core, *supra* note 28, at 77.

⁴⁴ This approach is also used to test the association between D&O insurance and the enactment of Sarbanes-Oxley Act, and whether this act influence D&O insurance transaction. See Anna Oh, *Insuring against Another Enron: The Role of Cross-listing Status of Canadian Firms on the Purchase of Directors' and Officers' Insurance in the aftermath of Sarbanes-Oxley Act of 2002*, Cornell University working paper (2009), available at <http://ecommons.cornell.edu/bitstream/1813/14231/2/AnnaOhFinalThesis1.pdf>.

⁴⁵ See David W. Hosmer & Stanley Lemeshow, *APPLIED LOGISTIC REGRESSION 1* (2000).

⁴⁶ Unless otherwise mentioned, all empirical works in this dissertation are conducted by these two software packages.

$$Coverage = \alpha + \beta_2 Industry + \beta_3 ROE + \beta_3 Remuneration + \beta_3 Indpdirector + \beta_3 Sdirector + \beta_3 Ctrlldirector + \beta_3 Dual + \beta_3 DARatio + \beta_3 Litigation + \varepsilon \quad (2)$$

C. Empirical result and analysis

1. Descriptive statistics

In 2008, when data of D&O insurance began to be available, 588 firms (49.4%) purchased D&O insurance and 615 (51.1%) did not. Afterwards, firms purchasing D&O insurance keeps on gradually and constantly increasing, indicating that more and more listed firms in Taiwan began to purchase D&O insurance. In recent three years, the percentage of firms purchasing D&O insurance is around 60%.

Table 2 Descriptive Statistics

	2008	2009	2010	2011	2012	2013	2014	Total
Firms without D&O	615 (51.1%)	586 (47.4%)	561 (44.6%)	540 (42.8%)	490 (39.4%)	456 (37.3%)	502 (38.9%)	3750 (43.0%)
Firms with D&O	588 (48.9%)	650 (52.6%)	697 (55.4%)	722 (57.2%)	755 (60.6%)	766 (62.7%)	787 (61.1%)	4965 (57.0%)
Total	1203	1236	1258	1262	1245	1222	1289	8715

After testing the difference between firms that purchased D&O insurance and firms without D&O insurance, it is found that insured firms usually have better performance and governance than uninsured companies. They have more independent directors, more audit committee members, smaller percentages of company stock being held by major shareholders, fewer controlled directors, and fewer managers and officers who have been appointed by the controlling company or parent group. This means that companies with better corporate governance and monitoring mechanisms purchase more D&O insurance. This is contrary to the previous monitoring hypothesis that monitoring mechanisms and D&O insurance are substitutes and are negatively related.

The percentage of remuneration all paid to directors of companies with D&O insurance is lower than among companies that do not purchase D&O insurance. This implies that companies that pay out less remuneration to company directors have greater demand for D&O insurance. This does support the hypothesis that remuneration and D&O insurance are substitutes for each other and are negatively related. The differences of duality, debt-asset ratio and litigation are not significant. Especially in litigation, the means of firms with and without D&O insurance are very similar, implying they do not have significant difference in litigation risk. This does not support the intuitive hypothesis that firms with more risk should have more demand for insurance, and not support monitoring hypothesis.

Table 3 Comparison between firms without and with D&O insurance (1)

	Firms without D&O			Firms with D&O			Total		
	Mean	N	Std. Dev.	Mean	N	Std. Dev.	Mean	N	Std. Dev.
<i>ROE</i>	2.4294	3407	15.12183	2.4235	4878	19.93992	2.426	8285	18.11341
<i>Remuneration</i> *	15.8876	2699	1.35815	15.0153	3936	14.17866	15.3701	6635	10.9626
<i>Indptdirector</i> *	0.8136	3403	1.1399	1.5571	4492	1.22735	1.2366	7895	1.24601
<i>auditcomitee</i> *	0.01	3407	0.096	0.10	4885	0.302	0.06	8292	0.244
<i>Ctrlrdirector</i> *	3.0022	3403	2.58074	2.6962	4492	2.31918	2.8281	7895	2.43992
<i>Sdirector</i> *	24.7604	3375	14.52494	21.6103	4480	14.5052	22.9638	7855	14.59631
<i>Dual</i>	0.3	3412	0.46	0.31	4885	0.461	0.31	8297	0.461
<i>Daratio</i>	104.0407	3403	394.97267	110.5088	4856	310.07387	107.8437	8259	347.56796
<i>Litigation</i>	0.15	3413	0.904	0.15	4885	0.581	0.15	8298	0.731

* indicates that the difference is significant in independent sample test.

2. Regression analysis

The variable concerning whether or not listed companies purchased D&O insurance is used as the dependent variable. The result shows that the variables *Industry*, *Auditcomitee*, *Ctrlrdirector*, and *Sdirector* are significant. The industry of the companies is positively related to their demand for D&O insurance. This does support the hypothesis developed from a review of the previous literature in that high technology industry in Taiwan has a greater need for D&O insurance. *Auditcomitee* is positively related to the purchase of D&O insurance, suggesting firms with more members in audit committee are intended to purchase D&O insurance. Additionally, *Sdirector* is negatively significant, implying firms with less percentage of shares held by directors purchase more insurance. These results are quite similar to the results of previous descriptive analyses, implying that the companies with better corporate governance have more demand for D&O insurance. In other words, the purchase of D&O insurance in Taiwan is related to the quality of corporate governance, but how corporate governance affects purchases of D&O insurance in Taiwan is contrary to the assumption of the monitoring hypothesis. The variable *Litigation* is not significant, and, therefore, no evidence could support the assumption that prior litigation will cause the demand for insurance. As a result, the theory of monitoring hypothesis may not be supported. On the contrary, signal hypothesis provides possible explanation for this empirical result. The firms with good corporate governance care more about corporate governance. In contrast to the firms with poor corporate governance, they are more willing to improve governance and reputation. Therefore, even though they have better governance, they are still willing to purchase D&O insurance. This may be because they care about corporate governance, so they do

not mind doing everything possible to promote governance and reputation in order to attract greater investments.

For the robustness test, which is different from the previous model for which the dependent variable is whether a company is insured or not, the amount of coverage is used as the dependent variable. The result is similar to the previous specification. *Remuneration* is positively significant, and this indicates that remuneration and D&O insurance for directors may not be substitutes. Significances of *Auditcomitee* and *Sdirector* are the same as the previous result. This implying firms with more remuneration, more audit committee members, and less shares held by directors, tend to purchase more insurance coverage. This once again provides evidence for rejecting monitoring hypothesis. Similarly, *Litigation* is still not significant, either. Thus, there is no evidence supporting the correlation between insurance coverage and litigation risk, which should be one of important consideration of insurance purchase.

Table 4 Result of regressions with panel data (1)

	(1) Purchase	(2) Coverage
<i>Industry</i>	0.0349*** (3.84)	-0.00439 (-1.67)
<i>ROE</i>	0.00538 (0.94)	0.00111 (0.72)
<i>Remuneration</i>	0.0241 (0.95)	0.0206** (2.75)
<i>Indpdirector</i>	-0.131 (-0.84)	-0.0645* (-2.01)
<i>Auditcomitee</i>	1.364* (1.99)	0.757*** (4.88)
<i>Ctrldirector</i>	0.582*** (7.68)	-0.000742 (-0.03)
<i>Sdirector</i>	-0.0377** (-2.68)	-0.00616*** (-3.97)
<i>Dual</i>	-0.0397 (-0.15)	-0.294*** (-5.97)
<i>DAratio</i>	0.00114 (1.45)	0.000329*** (6.13)
<i>Litigation</i>	0.135 (0.77)	0.00196 (0.15)
<i>Constant</i>	-	5.010*** (49.06)
<i>N</i>	912	3568
<i>R²</i>		0.0818

<i>Hausman test</i>	0.0000	0.0001
<i>Model</i>	fe	xtsc
<i>Mean VIF</i>	1.92	1.84

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

D. Summary

This section has discussed monitoring hypothesis and tested it within the context of Taiwan. The empirical evidence shows that the monitoring hypothesis is not supported in Taiwan. Firms with good corporate governance and less risk intend to purchase more D&O insurance. In contrast, firms with bad corporate governance and more risk intend to purchase less D&O insurance. A possible alternative explanation of this phenomenon is signal hypothesis. Firms with good corporate governance are usually more concerned about corporate governance. Even though they are of better quality and have less potential risk, they are still willing to purchase insurance to convey that they are good firms and thus improve their reputations and attract investors. Hence, more tests for signal hypothesis and opportunistic behavior will be provided in following sections.

III. Alternative hypothesis: Signal effect of D&O insurance

Following the previous test, this section will examine signal effect of D&O insurance more closely. The release of economically relevant information is important for the evaluation of firms' outstanding securities and the ability to attract investment in the future.⁴⁷ According to the reasoning of signal hypothesis, the purchase of D&O insurance will release signal to investors and investors will evaluate the purchase of D&O insurance positively. Thus, D&O insurance purchase should have positive effect on firms' stock price. However, with the protection of insurance, directors might have more opportunistic behavior or moral hazard.⁴⁸ Then the purchase of D&O insurance will no longer emit positive signal. In contrast, investors will worry about D&O insurance because the insurance may encourage risky behavior. Therefore the signal effect of D&O insurance is disputable.

In order to clarify this issue, two major empirical works will be conducted in this paper. In the first part, this paper uses the famous model proposed by Ohlson concerning evaluating value of firms to test the effect of D&O insurance. If there is positive relationship between D&O insurance and stock price, the positive effect of D&O insurance is implied. In contrast, inverse association between D&O insurance and stock price implies D&O insurance emits negative signal to the market. In the second part, this paper will analyze moral hazard and opportunistic behavior raised from D&O insurance. If the answer is positive, then as concerned by literatures, D&O insurance would induce

⁴⁷ See Robert M. Lawless et al., *The Influence of Legal Liability on Corporate Financial Signaling*, 23 J. Corp. L. 209 (1998).

⁴⁸ See Chen Lin et al., *Directors' and Officers' Liability Insurance and Acquisition Outcomes*, 27 (July 18, 2010). Journal of Financial Economics, available at <http://ssrn.com/abstract=1641645>.

moral hazard and opportunistic behavior and thus convey negative signal to the market.

A. Corporate governance and market value of firms

Albeit the discussion of corporate governance is sprouting, it should be wondered that firm's corporate governance behavior indeed increase their market value? However, in the United States, many empirical works cannot provide strong evidence for the relationship between corporate governance behavior and increase of market value.⁴⁹ Similar problems are also addressed in emerging market. Bernard S. Black, Hasung Jang and Woochan Kim test the relationship between corporate governance and market value of firms in Korea by OLS regression and instrument variables.⁵⁰ They find that corporate governance is an important but maybe casual factor of market value of firms.⁵¹ Bernard S. Black also carries out empirical analysis in Russian.⁵² He concludes that firm's corporate governance will affect their market value significantly if countries' constraints on corporate governance are limited.⁵³

However, different argument advocates corporate governance would substantially affect market value and shareholders.⁵⁴ Lawrence D. Brown and Marcus L. Caylor test the association between firms' performance and Gov-Score, which is composed by 51 corporate governance factors. They find firms with better governance indeed have better profit, more value and more benefit for shareholders.⁵⁵ Lucian A. Bebchuk, Alma Cohen and Allen Ferrell test the association between market value and corporate governance arrangements which are based on six provisions: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments. They find the index of such arrangements is inversely associated with market value.⁵⁶ Literatures also proposes that market value of firms would be affected their corporate governance in Russia.⁵⁷

B. D&O insurance, signal effect and market value of firms

Some literature proposes the positive effect of D&O insurance on firm's performance and market value. Sanjai Bhagat, James A. Brickley and Jeffrey L. Coles find that D&O

⁴⁹ See Bernard S. Black, *Does Corporate Governance Matter? A Crude Test Using Russian Data*, 149 U. Pa. L. Rev. 2131, 2131 (2001). Different argument like corporate governance can increase Apple's market value, see *In re Apple Computer, Inc. Derivative Litig.*, No. C 06-4128 JF (HRL), 2008 WL 4820784, at 2 (N.D. Cal. Nov. 5, 2008)

⁵⁰ See Bernard S. Black et al., *Does Corporate Governance Predict Firms' Market Values? Evidence from Korea*, 22 J.L. ECON. & ORG. 366, 366 (2006).

⁵¹ *Id.*

⁵² See Bernard S. Black, *Does Corporate Governance Matter? A Crude Test Using Russian Data*, 149 U. Pa. L. Rev. 2131, 2131 (2001).

⁵³ *Id.*

⁵⁴ See Lucian A. Bebchuk et al., *What Matters in Corporate Governance?*, 1 (September 1, 2004). Review of Financial Studies, Vol. 22, No. 2, 783-827, February 2009; Harvard Law School John M. Olin Center Discussion Paper No. 491 (2004), available at <http://ssrn.com/abstract=593423>.

⁵⁵ See Lawrence D. Brown & Marcus L. Caylor, *Corporate Governance and Firm Performance*, 1 (December 7, 2004), available at <http://ssrn.com/abstract=586423>.

⁵⁶ *Id.* at 39.

⁵⁷ 5 L of Intl Trade § 151:3.

insurance has positive on shareholder wealth and no negative effect is found.⁵⁸ Jinyoung Park also finds the D&O insurance can positively contribute shareholder's wealth.⁵⁹ He tests the association between D&O insurance coverage and the quality of firms' voluntary disclosure.⁶⁰ He finds that there is an association between insurance coverage and forecast frequency and precision.⁶¹ The more insurance coverage, the more disclosure occurs. There is also more precise and timely.⁶² Besides, positive response from market is given to such information.⁶³ All these results imply the positive signal effect of D&O insurance.

However, it is controversy that whether D&O insurance increase firm performance and shareholder's wealth. The negative viewpoint mainly bases on the problem and risk that might be induced by D&O insurance. If D&O insurance represents the potential risk, opportunistic behavior and moral hazard, firms would avoid purchasing D&O insurance to damage the reputation and value of firms. Irene Y. Kim tests Canadian market and confirms the hypothesis that opportunism in financial reporting can be predicted by excess D&O insurance coverage.⁶⁴ Besides, litigation risk, corporate governance quality, high-tech industry, and leverage are inversely related to D&O insurance coverage.⁶⁵ In consequence, opportunistic behavior is implied. Narjess Boubakri and Nabil Ghaleb again test Canadian market and have more negative conclusion. D&O insurance indeed induces opportunistic behavior and has negative impact on firms' performance in the future.⁶⁶ Besides, their findings show that insurer cannot distinguish opportunistic risk and mandatory reporting is not so helpful.⁶⁷ Under such circumstance where asymmetric information and moral hazard are obvious, regulation and limitation are recommended.⁶⁸

C. Research design

1. Application of Ohlson model

When evaluating firm value, non-accounting is usually and relatively less explored.⁶⁹ The

⁵⁸ See Sanjai Bhagat, James A. Brickley, Jeffrey L. Coles, *Managerial Indemnification and Liability Insurance: The Effect on Shareholder Wealth*, 54.4 *The Journal of Risk and Insurance* 721, 733 (1987).

⁵⁹ See Jinyoung Park, *The Effect of Directors' and Officers' Liability Insurance and Indemnification on Voluntary Disclosure: Evidence from Canadian Firms*, University of Michigan working paper, 30, available at http://som.umflint.edu/research/docs/20052006/200506_JP_I.pdf.

⁶⁰ *Id.* at 3.

⁶¹ *Id.* at 4.

⁶² *Id.*

⁶³ *Id.*

⁶⁴ See Irene Y. Kim, *Directors' and Officers' Insurance and Opportunism in Accounting Choice*, Duke University working paper, 21 (2005), available at http://www.efmaefm.org/efma2006/papers/764024_full.pdf.

⁶⁵ *Id.*

⁶⁶ See Narjess Boubakri & Nabil Ghaleb, *Does Mandatory Disclosure of Directors' and Officers' Liability Insurance Curb Managerial Opportunism? Evidence from the Canadian Secondary Market*, Ninth Annual Asian Academic Accounting Association Conference Program, 29-30 (November 29, 2008), available at http://69.175.2.130/~finman/Reno/Papers/Does_Mandatory_Disclosure_Curb_Managerial_Opportunism.pdf.

⁶⁷ *Id.* at 30.

⁶⁸ *Id.*

⁶⁹ See Alnoor Bhimania et al., *Accounting and non-accounting determinants of default: An analysis of*

Ohlson model can give a direct link between accounting amount and firm value. With the following refinement, the Ohlson model has been frequently applied in the valuation model of firms in accounting research.⁷⁰ The model postulates abnormal earnings by following two equations:⁷¹

$$\tilde{x}_{t+1}^a = \alpha x_t^a + v_t + \tilde{\varepsilon}_{1t+1} \quad (3)$$

$$\tilde{v}_{t+1} = \gamma v_t + \tilde{\varepsilon}_{2t+1} \quad (4)$$

Where v_t indicates the information not yet captured by accounting and $\tilde{\varepsilon}$ is mean 0 disturbance term.⁷² The Ohlson model is applied to evaluate how D&O insurance and corporate governance might affect firms' market value.

2. Hypothesis development

In addition to the Ohlson model, this paper also follows the thoughts of Lawrence D. Brown and Marcus L. Caylor which tests the relationship between firm performance and corporate governance,⁷³ to test the relation between firm performance, corporate governance and D&O insurance purchase. This paper assumes D&O insurance have positive effect on firms' market value. The core issue that should be defined first is, is D&O insurance a positive or negative signal to the market? Even though D&O itself is positive news, if it is accompanied by other information such as more internal risks, will this negatively affect firms' performance and market price? If D&O insurance protects directors and officers and lets them concentrate on management without worrying about litigation risk, D&O insurance will have positive signal effect. In contrast, if D&O insurance implies that firms might be not confident about their businesses, and firms might be in potential litigation trouble. Even worse, if the problems of moral hazard and adverse selection have been induced, then the purchase of D&O insurance is a bad news to the market. In this way, whether or not D&O insurance can spur firms to optimize their corporate governance is an important signal to the market.⁷⁴ Under the theory of signal hypothesis, the purchase and coverage of D&O insurance will convey a positive signal to the market and thus improve the market value of insured firms.

In addition to the main hypothesis, other relevant variables are used as control variables. As discussed in the literature review, the effect of corporate governance on firms' market

privately-held firms, 29(6) Journal of Accounting and Public Policy 517, 520 (2010).

⁷⁰ See Chii-Shyan Kuo, THE PRICING AND DETERMINANTS OF THE DISCRETIONARY COMPONENT OF EMPLOYEE STOCK OPTION VALUE 51, ProQuest (2007).

⁷¹ See Kin Lo & Thomas Z. Lys, *The Ohlson Model: Contribution to Valuation Theory, Limitations, and Empirical Applications*, 12 (February 2000). Sauder School of Business Working Paper, available at <http://ssrn.com/abstract=210948> or doi:10.2139/ssrn.210948.

⁷² *Id.*

⁷³ See Lawrence D. Brown and Marcus L. Caylor, *supra* note 55, at 1.

⁷⁴ See Sean J. Griffith, *Unleashing a Gatekeeper: Why the SEC Should Mandate Disclosure of Details Concerning Directors' & Officers' Liability Insurance Policies*, 28(March 24, 2005). U of Penn, Inst for Law & Econ Research Paper No. 05-15, available at <http://ssrn.com/abstract=728442> or doi:10.2139/ssrn.728442.

value is controversial. If D&O insurance is an outside monitoring mechanism for corporate governance, it would be reasonable to believe that D&O insurance and other governance mechanisms affect insured firms' market value. This paper assumes other corporate governance mechanisms would positively affect firms' market value.

3. Variables

Utilizing the Ohlson model, accounting and non-accounting information affects firms' market value. Researchers traditionally use stock price as market value. In D&O insurance literature, M. Martin Boyer also uses market value of equity as the measure of the wealth of shareholder.⁷⁵ This study uses the market value of firms as the dependent variable. Regarding independent variable, the variables *bv* and *EPS* represent the book value of and earnings per share of firms. Regarding the proxy variable of D&O insurance, *purchase* is a binary variable, which is coded as "1" when firms with insurance and "0" otherwise. Then variable *coverage* is the natural logarithm of D&O insurance coverage. In order to analyze the effect of D&O insurance on firms' performance completely, this paper will use these two D&O insurance proxy variables in separate panels. The variable *purchase* would be used in panel A, and the variable *coverage* would be used in panel B.

In terms of the proxy variables of corporate governance, this paper would like to follow the previous section and consider them as important non-accounting information. First of all, it is usually believed that the duality of the chairman of board (COB) and Chief Executive Officer (CEO) is negatively related to market value of firms. Under agency theory, the duality of COB and CEO might cause interest conflict and damage the benefit of firms. Maria Carapeto, Meziane Lasfer and Katerina Machera test this issue by event study, and their research strongly support agency theory.⁷⁶ They find that the announcement of split of COB and CEO would cause positive abnormal returns and vice versa.⁷⁷ In order to test the influence of duality of COB and CEO on the performance of firms, this section considers the variable *dual*. Ideally, independent directors are not affected by interest conflict and it is usually considered as a good mechanism for corporate governance.⁷⁸ Accordingly, appointment of independent or outside directors should convey positive signal to the market and have a significant positive price effect. However, Bernard S. Black, Hasung Jang and Woochan Kim argue that even in developed countries there is no evidence to prove that firms with more independent directors have better performance or higher share price.⁷⁹ Moreover, appointment of additional independent directors may signal that firms plan to address business problem.⁸⁰ Some empirical research propose that more independent directors have no statistically significant effect on board's performance. Some literature even argue that more

⁷⁵ See M. Martin Boyer, *Directors' and Officers' Insurance and Shareholder Protection*, 9 (March 2005), available at <http://ssrn.com/abstract=886504>.

⁷⁶ See Maria Carapeto, Meziane Lasfer and Katerina Machera, *Does Duality Destroy Value?*, 15 (January 12, 2005). Cass Business School Research Paper, available at <http://ssrn.com/abstract=686707>.

⁷⁷ *Id.*

⁷⁸ See Perry E. Wallace, *Accounting, Auditing and Audit Committees after Enron, Et Al.: Governing outside the Box without Stepping off the Edge in the Modern Economy*, 43 WASHBURN L.J. 91, 114 (2003).

⁷⁹ See Bernard S. Black et al., *supra* note 50, at 408.

⁸⁰ See Sanjai Bhagat & Roberta Romano, *Event Studies and the Law: Part II: Empirical Studies of Corporate Law*, 4 AM. L. & ECON. REV. 380, 402 (2002).

independent directors would make board's performance worse.⁸¹ In emerging market, Rajesh Chakrabarti, Krishnamurthy Subramanian and Frederick Tung test India market and find that independent director is indeed an importance component of monitoring function and adds the value of firms.⁸² Even though the results are controversial, but the importance of independent director is undisputable. This paper hypothesizes that the number of independent directors is positively or negatively related to market value of firms, and the variable *Indpdirector* is contained in regressions. Similarly, the variable *Auditcomitee*, indicating the number of audit committee members, is also included in this section.

The value of shares may be affected the ownership structure of firms. In firms with dispersed ownership, individual shareholders have less possibility and more cost to control the firms. They also have less incentive to monitor firms. As a result, control is in the hand of management.⁸³ On the other hand, in firms with concentrated ownership, controlling shareholders and blockholders have more incentive to monitor management.⁸⁴ However, blockholders are also a source of agency cost because they may act for their own benefits and other investors may have to pay for such costs. If investors expect more cost than benefit from ownership, they will discount the shares. In contrast, if investors expect more benefit than cost, they may be willing to pay more.⁸⁵ Every ownership structure may have different impacts on investors. This is also why securities law regulates the disclosure of ownership structure.⁸⁶ Besides, dominant owner might also influence firms' performance and corporate governance.⁸⁷ Jayesh Kumar tests Indian market and finds that the shares of directors would significantly influence firms' performance beyond a certain threshold.⁸⁸

These factors such as board and ownership structure also affect the risk of directors and related with D&O insurance. Thus, the variable *Ctrldirector* which indicates the number of controlled directors is also included in this section. This paper hypothesizes that it is negatively related to market value of firms. The variable *Sd* captures the number of shares of directors. These variables are also expected to be negatively related to market value of firms. Similarly, *Remuneration*, *DARatio*, and *Litigation*, which are important proxies for corporate governance, are also included in specification here. In conclusion, in order to consider the effect of D&O insurance and corporate governance on firms' market value, this paper adds D&O insurance and corporate governance into Ohlson model and

⁸¹ See Sanjai Bhagat & Bernard Black, *The Uncertain Relationship Between Board Composition and Firm Performance*, 54 BUS. L. REV. 921, 943 (1999).

⁸² See Rajesh Chakrabarti, Krishnamurthy Subramanian and Frederick Tung, *Independent Directors and Firm Value: Evidence from an Emerging Market*, 20 (June 28, 2010), available at <http://ssrn.com/abstract=1631710>.

⁸³ See Michael C. Schouten, *The Case for Mandatory Ownership Disclosure*, 15 STAN. J.L. BUS. & FIN. 127, 135 (2009).

⁸⁴ *Id.*

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ See Jayesh Kumar, *Agency Theory and Firm Value in India*, Indira Gandhi Institute of Development Research, 23, available at <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023822.pdf>.

⁸⁸ *Id.* at 23-24.

reformulates the new equation below. *DO* represents the proxy variable of D&O insurance, including *Purchase* and *Coverage*. *CG* represents the proxy variables of corporate governance, including *Dual*, *Idirector*, *Sd*, *ctrldirector*, *Remuneration*, *DAratio*, and *Litigation*. The definitions of variables can be found in Table 1.

$$MV = a_0 + a_1BV + a_2 EPS + a_3 CG + a_4 DO \quad (3)$$

C. Empirical result and analysis

1. Descriptive analysis

Considering the new variables in this model, it is found that the difference of means between insured and uninsured firms is significant. This indicates that insured firms have significantly higher market value and EPS than uninsured firms. Two implications can be drawn from this result. First, this result echoes to the previous findings that firms with better performance have more demand for D&O insurance, and this is different from the monitoring hypothesis. Secondly, firms that purchase D&O insurance also have higher market value, and this implies D&O may be beneficial for firms' market value. Thus, the signal hypothesis may be supported. In this way, the effect and magnitude of D&O insurance will be tested by following regression analyses.

Table 5 Comparison between firms without and with D&O insurance (2)

	Firms without D&O			Firms with D&O			Total		
	Mean	N	Std. Dev.	Mean	N	Std. Dev.	Mean	N	Std. Dev.
BV*	14.5040	3340	1.31944	14.8240	4682	1.46317	14.6908	8022	1.41386
EPS*	1.1884	3340	2.49344	1.6212	4682	4.14476	1.4410	8022	3.55798

* indicates that the difference is significant in independent sample test.

2. Regression analysis

In the first panel, the dummy variable, insured or not, is used as proxy variable of D&O insurance. It is found that the variables of D&O insurance purchase and the number of independent directors are positively significant. Furthermore, its coefficient 0.0604 is large, compared with other significant variables. This demonstrates that the purchase of D&O insurance is positively correlated to market value of firms. In the second panel, D&O insurance coverage is used as a proxy variable of D&O insurance and still positively significant. This provides more obvious evidence than the previous panel and indicates a positive association between D&O insurance and market value. From such positive correlation, the positive signal effect of D&O insurance will be one possible explanation. Regarding proxy variables of corporate governance, the empirical result is roughly similar to the result of previous section. More firms with more independent director and

audit committee members have more D&O insurance purchase and coverage. And thus monitoring hypothesis is more likely to be rejected, and signal hypothesis is more likely to be supported.

Moreover, debt-asset ratio and prior litigation of firms are also positively correlated to the market value of firms. The possible explanation may be that firms which are more active may not only have better performance in market value and EPS, but also induce more controversies and litigations. This can be understandable. However, if over risk-taking behavior is induced by D&O insurance, this may mitigate the function of insurance and thus create more problems. Thus, more tests about opportunistic behavior and D&O insurance will be provided in the next section.

Table 6 Result of regressions with panel data (2)

	(1)	(2)
	mv	
<i>Bv</i>	0.890*** (104.73)	0.879*** (111.87)
<i>EPS</i>	0.0888*** (22.37)	0.0891*** (21.44)
<i>Purchase</i>	0.0604** (2.94)	
<i>Coverage</i>		0.000133*** (7.22)
<i>Industry</i>	0.00156 (0.65)	0.00165 (0.65)
<i>Indpdirector</i>	0.0382*** (9.54)	0.0416*** (9.39)
<i>Auditcomitee</i>	0.0971** (2.95)	0.0843* (2.06)
<i>Ctrldirector</i>	-0.00838 (-0.87)	-0.00868 (-0.88)
<i>Sd</i>	0.00304*** (4.39)	0.00282*** (3.90)
<i>Dual</i>	-0.00637 (-0.52)	-0.00855 (-0.66)
<i>Daratio</i>	0.000309*** (10.39)	0.000295*** (11.19)
<i>Litigation</i>	0.0236** (2.87)	0.0165** (3.24)
<i>Constant</i>	1.619*** (10.51)	1.797*** (13.58)

<i>N</i>	7795	8083
<i>R</i> ²	0.8846	0.8831
<i>Hausman test</i>	0.0000	0.0000
<i>Model</i>	xtscc	xtscc
<i>Mean VIF</i>	2.42	2.22

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

D. Summary

From the empirical tests in this section, they demonstrate a positive association between D&O insurance purchase and market value of firms. Purchasing D&O insurance and increasing insurance coverage are positively correlated to the increase of market value of firms. This result not only matches with the previous empirical results, but also sheds light on the effect of D&O insurance. A possible explanation is the signal hypothesis – a firm may purchase D&O insurance for bettering its reputation. Even though insurance costs premium, but it can convey a positive signal which is as important as the book value and EPS of firms. Hence, the empirical result provides possible support for the signal hypothesis and explains why firms will do so even though they have good corporate governance.

IV. Risk taking and opportunistic behavior

Following the previous tests, this section further tests if the opportunistic problem happens in Taiwanese D&O insurance market, and thus affects the function of D&O insurance. In literature review, previous researches concerning moral hazard in insurance, especially in D&O insurance, will be introduced and hypotheses will be developed. By hypothesizing that D&O insurance will not increase insured firms' volatility of returns and short term investments, this research will test whether D&O insurance induces more risky behavior of insured firms. In the end, the empirical results and relevant discussion will be presented. This dissertation will conclude whether D&O insurance produces moral hazard and thus affect insurers' monitoring function.

A. Insurance and risk taking

Regarding the effect of D&O insurance, there are mainly two opposite arguments. As mentioned before, monitoring hypothesis propose that insurer can monitor insured firms and even improve their corporate governance. In contrast, opponents argue that D&O insurance weaken managerial control device such as litigation.⁸⁹ Many recent researches find that managerial opportunism is one factor of D&O insurance purchase.⁹⁰ The reason

⁸⁹ See Jinyoung Park, *supra* note 59, at 6.

⁹⁰ *Id.* at 6.

of managerial opportunism might come from the positive signal effect of D&O insurance. Jinyoung Park finds that there is a positive association between insurance coverage and forecast frequency and precision.⁹¹ Also, market will give positive response to such information.⁹² This implies the positive signal effect of D&O insurance. Because of the positive effect and response from the market, opportunism exists in firms' voluntary disclosure. Thus, managers might intend to report earnings aggressively to increase their compensation.⁹³ To response this, auditors intend to charge higher fees to the firms of which the managers have higher opportunistic risk in Canada.⁹⁴ On the other hand, M. Martin Boyer and Hanon Amandine have different finding about the impact of accounting discretion on D&O insurance purchase. By testing Canadian market, they find that the positivity of discretionary accruals have no significant impact on D&O insurance purchase.⁹⁵ This implies moral hazard does not affect the financial disclosure.⁹⁶ In addition to accounting opportunism,⁹⁷ firms might carry more opportunistic behavior. Chen Lin, Micah S. Officer, Rui Wang and Hong Zou test Canada D&O insurance market and find that there is an association between D&O insurance coverage and higher as-issue bond yields, higher loan spreads, and higher risk taking. This result demonstrates that debt holder perceps that higher D&O insurance coverage implies higher risk.⁹⁸ The concerns about moral hazard and asymmetric information are also implied. Chen Lin, Micah S. Office and Hong Zou again test the association between D&O insurance and acquirer cumulative abnormal announcement returns (CARs). They find there is an inverse association. This means acquirers with higher D&O insurance coverage have less acquisition synergies and pay more premiums.⁹⁹ This implies D&O insurance might induce moral hazard.¹⁰⁰ John M. R. Chalmers, Larry Y. Dann, Jarrad Harford find there is an inverse association between D&O insurance coverage and the performance of 3-year stock price.¹⁰¹ And

⁹¹ *Id.* at 4.

⁹² *Id.*

⁹³ See Hyeesoo H. Chung & Jinyoung P. Wynn, *Managerial Legal Liability Coverage and Earnings Conservatism*, 46 J. ACCT. & ECON. 135, 135 (2008).

⁹⁴ See Hyeesoo H. Chung, Jinyoung P. Wynn & Han Yi, *Managerial Opportunism Legal Liability Rule and Audit Pricing* 28 (2008), available at <http://aaahq.org/meetings/AUD2009/ManagerialOpportunism.pdf>.

⁹⁵ See M. Martin Boyer & Hanon Amandine, *Protecting Directors and Officers from Liability Arising from Aggressive Earnings Management* 11 (2009), available at <http://ssrn.com/abstract=1504208>.

⁹⁶ *Id.*

⁹⁷ In addition to D&O insurance, Robert M. Bowen, Shivaram Rajgopal and Mohan Venkatachalam further confirm previous literature and the association between poor corporate governance and accounting discretion. See Robert M. Bowen, Shivaram Rajgopal & Mohan Venkatachalam, *Accounting Discretion, Corporate Governance and Firm Performance* 30 (2005), available at <http://ssrn.com/abstract=367940>.

⁹⁸ See Chen Lin et al., *Directors' and Officers' Liability Insurance and the Cost of Debt* 20-21 (2011), available at <http://ssrn.com/abstract=1865679>.

⁹⁹ See Chen Lin et al., *Directors' and Officers' Liability Insurance and Acquisition Outcomes* 26-27 (2010), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1641645.

¹⁰⁰ *Id.* at 27. In addition, moral hazard is a significant concern in liability insurance. D&O liability insurance may considerably nullify the deterrence effects of litigation against directors, causing directors to be less attentive to their duties to shareholders. See Clifford G. Holderness, *supra* note 17, at 115.

¹⁰¹ See John M. R. Chalmers et al., *Managerial Opportunism? Evidence from Directors' and Officers' Insurance Purchases*, 57.2 J. FIN. 609, 633 (2002). They provide two interpretations for the use of D&O insurance. First, managers use insurance to solidify their ability to exploit inside information. Secondly,

managers who have high D&O insurance coverage have poor performance in the future.¹⁰² Narjess Boubakri, Martin Boyer, and Nabil Ghaleb further confirm this result. They find managers purchase D&O insurance for opportunistic earnings, and insurers would charge more premiums for those who have higher opportunistic risk.¹⁰³ By testing Canadian market, Boyer finds that there is a moral hazard problem for managers because D&O insurance reduces their ability to increase cash flow.¹⁰⁴ Peter Egger, Doina Radulescu, and Ray Rees find that if senior executives have some incentives to make short run gains, they must be insured to prevent the adverse consequences.¹⁰⁵ Generally speaking, majority of previous literature support the hypothesis that D&O insurance might induce moral hazard or opportunistic behavior. If this conclusion is also true in the Taiwanese market, then D&O insurance itself is no longer good news. D&O insurance represent not only the cover of litigation risk, but also the trigger of opportunistic behavior.

B. Research design

1. Hypothesis development

As mentioned above, there is much literature discussing D&O insurance, opportunistic behavior and accounting discretion. Moral hazard is tested in this section. Due to D&O insurance shielding litigation risk, insured firms may engage in more risky behaviors. If the insured directors, managers and firms behave opportunistically for an extended period of time, this is easy to be found by insurers. Insurers will adjust premium or even discontinue contract in response to risky behavior. In addition to long term performance, attention should be paid to short term performance after the purchase of D&O insurance. This study diverges from the previous literature on shareholder wealth and long term performance by focusing on short term performance.

In short term performance, D&O insurance purchase might cause volatility of returns. The protection of insurance, allows directors and officers assurances to limit concern regarding litigation risk, expect intentional behavior. In order to maximize their benefit, rational directors and officers might do a highly volatile investment which has higher risk and higher return, as long as this is not excluded by policy exclusions. They will not do this in the long term, because insurers will discover opportunistic behavior and raise the rates. So after D&O insurance purchase, directors and officers might increase opportunistic investment, but not to the extent that is excluded by policies or in the long term to avoid exposure.

The null hypothesis is developed as follows: in Taiwan, D&O insurance would not increase the firms' volatility of returns and short term investments. In other words, D&O

D&O insurance is used to protect the assets of managers and firms from litigations. Even though these two interpretations are not exclusive, their evidence implies that the former is more important. *Id.*

¹⁰² *Id.*

¹⁰³ See Narjess Boubakri & Nabil Ghaleb, *supra* note 66, at 29-30.

¹⁰⁴ See M. Martin Boyer, *supra* note 75, at 103.

¹⁰⁵ See Peter Egger et al., *D&O Insurance, Corporate Governance and Managerial Incentives* 22 (2011), available at http://www.sgvs.ch/congress11/upload/p_115-420219.pdf.

insurance would not cause opportunistic behavior and moral hazard of firms. As a result, the theory regarding the positive signal effect of D&O insurance will not be influenced by these concerns. The hypothesis may be named “neutral hypothesis” and is as follows: D&O insurance would not increase the firms’ volatility of returns and short term investments. This study uses the standard deviation of ROE as dependent variable, and the standard deviation ROA, EPS, debt-asset ratio and short term investment of firms for robustness check. If there is no moral hazard and opportunistic behavior in the Taiwan market, the purchase of D&O insurance and its coverage shall be not significantly related to these dependent variables. This leads to the sub-hypotheses: The purchase or coverage of D&O insurance is not related to the standard deviation of ROE, ROA, EPS, debt-asset ratio and short term investment of firms. In addition to the proxy variable of D&O insurance, the quality of the corporate governance of firms is used as control variables. In general, firms having better corporate governance might have less volatility in returns.¹⁰⁶ Hence, this paper hypothesizes that the quality of corporate governance is negatively related to the volatility in returns, which contains the standard deviation of ROE, ROA, EPS, debt-asset ratio and short term investment of firms. This hypothesis may be called “corporate governance hypothesis” and is as follows: The quality of corporate governance of firms is inversely related to the standard deviation of ROE, ROA, EPS, debt-asset ratio and short term investment of firms.

2. Variable

Regarding the evaluation of opportunism, the standard deviation of revenues is usually used as proxy variables. When testing managerial opportunism caused by D&O insurance, John M. R. Chalmers, Larry Y. Dann and Jarrad Harford use standard deviation of revenues and operating income as proxy variables.¹⁰⁷ Jens Hagedorff, Ignacio Hernando, Maria J. J. Nieto and Larry D. Wall use the standard deviation of ROE as a proxy variable of riskiness.¹⁰⁸ Michael Bradley and Dong Chen, similarly, use standard deviation of monthly stock returns as a dependent variable in assessing corporate risk-taking.¹⁰⁹ In measuring the volatility of firms’ accounting performance,

¹⁰⁶ Firms with poor corporate governance usually have poor performance, poor profit and higher volatility. See Dr. Laurence J. Stybel, Maryanne Peabody, *A New Balance of Power Means New Boardroom Opportunity for General Counsel*, 23 No. 5 of Counsel 9 (2004). Besides, CalPERS’ stated goal is also to “join in the dialogue of corporate governance and reduce volatility and increase long-term share values.” See Deborah J. Martin, *The Public Piggy Bank Goes to Market: Public Pension Fund Investment in Common Stock and Fund Trustees’ Social Agenda*, 29 SAN DIEGO L. REV. 39, 45 (1992). Moreover, problems of corporate governance would cause market volatility. See Yuwa Wei, *Volatility of China’s Securities Markets and Corporate Governance*, 29 SUFFOLK TRANSNAT’L L. REV. 207, 208 (2006). In emerging market of Brazil, firms satisfying better corporate governance standards are less sensitive to changes in market and have less volatility in stock prices. See Ronald J. Gilson, Henry Hansmann, Mariana Pargendler, *Regulatory Dualism as a Development Strategy: Corporate Reform in Brazil, the United States, and the European Union*, 63 STAN. L. REV. 475, 501 (2011).

¹⁰⁷ See John M. R. Chalmers et al., *supra* note 101, at 625.

¹⁰⁸ See Jens Hagedorff et al., *What Do Premiums Paid for Bank M&As Reflect? The Case of the European Union* 21 (2010), available at <http://ssrn.com/abstract=1592887>.

¹⁰⁹ See Michael Bradley & Dong Chen, *Corporate Governance and the Cost of debt: Evidence from Director Limited Liability and Indemnification Provisions*, 17 J. CORP. FIN. 83, 92 (2011).

Seunghan Nam uses the standard deviation of ROE to test its volatility.¹¹⁰ The reason is that ROE is a more relevant measure from the viewpoint of shareholder, and other proxy variables such as ROA, EPS and growth of EPS also have similar results. This study follows previous literature and uses the standard deviation of ROE as the proxy variable of opportunistic behavior.¹¹¹ They are used as the dependent variables of regressions. For a test of robustness, this dissertation uses standard deviation of ROA, EPS, debt-asset ratio and short term investment as dependent variables in different panels. Regarding independent variables, the dummy variable, purchased insurance or not, and the amount of coverage are used as the proxy variables for D&O insurance. The variables about corporate governance are applied as control variables, including remuneration for directors, return on equity, the number of independent directors, the number of controlled directors, shares owned by director, duality of CEO and COB, debt-asset ratio and prior significant litigation. The definitions of variables are presented in Table 1.

C. Empirical result and analysis

1. Descriptive analysis

The results show that the insured firms have less and significant volatility in ROA, but more volatility in EPS and short-term investment. This implies firms might have more opportunistic behavior in EPS and short-term investment after D&O purchase. However, the differences between firms with and without D&O insurance are not significant in ROE and debt-asset ratio. Consequently, it is suspicious that insured firms have more volatility in returns and investments. The result of descriptive analysis is reported in Table 7.

Table 7 Comparison between firms without and with D&O insurance (3)

	Firms without D&O		Firms with D&O		Total	
	Mean	N	Mean	N	Mean	N
<i>S_ROE</i>	3.5135	3409	3.1864	4880	3.3209	8289
<i>S_ROA</i> *	1.4555	3409	1.2971	4880	1.3622	8289
<i>S_EPS</i> *	.5750	3407	.6496	4880	.6189	8287
<i>S_DAratio</i>	34.6412	3409	63.6736	4880	51.7335	8289
<i>S_Sti</i> *	153349.33	3409	553883.44	4880	389156.60	8289

* indicates that the difference is significant in independent sample test.

¹¹⁰ See Seunghan Nam, *The Impact of Non-audit Services on Capital Markets* 18 (2006), available at <http://ssrn.com/abstract=693422>.

¹¹¹ Similarly, Standard deviation of ROE is also often used as a proxy variable for the risk of insurers. See J. David Cummins & Gregory P. Nini, *Optimal Capital Utilization by Financial Firms: Evidence from the Property-Liability Insurance Industry*, 21. 1(2) J. FIN. SERV. RES. 15, 23 (2002).

2. Regression analysis

As the previous tests, binary variable insurance purchase is used in the first panel, and numeric variable nature logarithm of coverage is used in the second panel. Standard deviations of ROE, ROA, EPS, debt-asset ratio and short-term investment are used as dependent variables in respective regressions.

In the first panel, D&O insurance purchase is not positively significant in these regressions except when dependent variable is standard deviation on short-term investment. This implies no statistically significant evidence proving that the purchase of D&O insurance will increase opportunistic behavior. Moreover, D&O insurance purchase is negatively significant when dependent variable is standard deviation on ROA, implying insurance purchase correlates to even less volatility. In the second panel, insurance coverage is negatively significant when dependent variable is standard deviation of ROE and ROA, and not significant in other specifications. Clearly, it does not support the concern that firms with more coverage may have some intention to conduct opportunistic behavior, and implies less volatility in ROE and ROA. Also, the test results of corporate governance hypothesis are consistent. For litigation risk, it is generally and positively significant in many specifications. This supports the concern that firms with more litigation risk usually have more volatility in investment.

In conclusion, all these results demonstrate that the D&O increase purchase and coverage is not positively and significantly correlated to the variance in earnings and investment behavior. In other words, no consistent evidence is found to prove a positive correlation between D&O insurance and the opportunistic behavior and moral hazard of firms. The detailed results are reported from Table 8 and 9.

D. Summary

In this section, this study empirically tests whether D&O insurance is correlated to opportunistic behavior and moral hazard. Empirical evidence shows that the purchase of D&O insurance and its coverage are not significantly and negatively correlated to variances of earnings and investments. In consequence, even though some scholars argue that insurance may cause opportunistic behavior and moral hazard or even damage firms eventually, the empirical work does not find such significant evidence. Hence, the previous tests about the monitoring and signal effect of D&O insurance may not be affected by opportunistic behavior and moral hazard in Taiwan. And the previous proposal to limit D&O insurance may need more evidence to be supported and justified in Taiwan.

Table 8 Result of regressions with panel data (3)

	(1)	(2)	(3)	(4)	(5)
	S_ROE	S_ROA	S_EPS	S_DAratio	S_Sti
<i>Purchase</i>	-0.0800 (-1.03)	-0.0752** (-2.59)	0.0554 (1.44)	61.66 (1.21)	67885.2*** (3.66)
<i>Industry</i>	0.00604 (0.70)	-0.00350 (-0.63)	-0.000162 (-0.09)	7.516* (2.41)	486.7 (0.14)

<i>ROE</i>	-0.0598 (-1.87)	-0.00980 (-1.64)	0.000661 (0.19)	0.693 (0.46)	5864.6*** (4.30)
<i>Remuneration</i>	-0.0151 (-1.32)	-0.000582 (-0.23)	0.00188 (1.87)	3.299 (1.55)	13731.1* (2.34)
<i>Indpdirector</i>	-0.255*** (-5.86)	-0.0174 (-0.85)	0.0231* (1.99)	-40.24 (-1.37)	79795.7*** (3.98)
<i>Auditcomitee</i>	-0.635* (-2.02)	-0.146 (-1.82)	0.00691 (0.08)	-57.84*** (-3.41)	1400111.4*** (4.07)
<i>Ctrldirector</i>	-0.241*** (-5.52)	-0.0943*** (-6.72)	-0.0298*** (-13.68)	-12.87** (-3.00)	12475.1 (1.12)
<i>Sdirector</i>	0.0192** (2.80)	0.00192 (0.95)	0.000759 (1.73)	-0.333 (-1.04)	-7383.2** (-2.99)
<i>Dual</i>	0.619* (2.43)	0.208** (2.70)	-0.00792 (-0.68)	-32.32 (-0.89)	-230547.1*** (-6.88)
<i>DAratio</i>	0.00617*** (9.78)	-0.0000514 (-0.71)	0.0000619* (2.47)	0.410*** (5.83)	2076.7* (2.30)
<i>Litigation</i>	0.313* (2.36)	0.0883* (2.46)	0.0491*** (3.33)	-8.582* (-2.31)	89696.8** (2.81)
<i>Constant</i>	3.140*** (13.21)	1.598*** (8.60)	0.576*** (18.66)	-15.48 (-0.37)	-132515.5 (-1.85)
<i>N</i>	6401	6401	6398	6401	6401
<i>R²</i>	0.1379	0.0282	0.0121	0.0037	0.0735
<i>Hausman test</i>	0.0000	0.0000	0.0000	0.9711	0.0000
<i>Model</i>	xtscc	xtscc	xtscc	re	xtscc
<i>Mean VIF</i>	1.96	1.96	1.96	1.96	1.96

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9 Result of regressions with panel data (4)

	(1)	(2)	(3)	(4)	(5)
	S_ROE	S_ROA	S_EPS	S_DAratio	S_Sti
<i>Coverage</i>	-0.000336* (-2.14)	-0.000114** (-3.22)	0.0000582 (1.12)	0.103 (1.12)	616.4 (1.86)
<i>Industry</i>	0.00434 (0.47)	-0.00436 (-0.79)	-0.000242 (-0.14)	7.542* (2.44)	1102.2 (0.34)
<i>ROE</i>	-0.0342 (-0.95)	-0.00913 (-1.52)	0.00105 (0.31)	5.328 (1.33)	5324.5*** (4.20)
<i>Remuneration</i>	-0.0194 (-1.29)	-0.000439 (-0.17)	0.00193 (1.82)	2.025 (1.54)	12039.1* (2.41)
<i>Indptdirector</i>	-0.294*** (-7.29)	-0.0258 (-1.08)	0.0223 (1.60)	-40.21 (-1.52)	70191.5*** (4.63)
<i>Auditcomitee</i>	-0.557 (-1.55)	-0.128 (-1.65)	0.0100 (0.12)	-88.47*** (-3.98)	1150799.4** (3.15)
<i>Ctrldirector</i>	-0.271*** (-6.59)	-0.0942*** (-6.72)	-0.0305*** (-12.39)	-19.42** (-3.10)	15236.4 (1.79)
<i>Sdirector</i>	0.0167** (2.75)	0.00216 (1.06)	0.000681 (1.32)	-0.747 (-1.28)	-7144.8** (-3.01)
<i>Dual</i>	0.673** (2.67)	0.191* (2.45)	0.0229 (1.21)	-10.47 (-0.34)	-196490.5*** (-7.12)
<i>DAratio</i>	0.00629*** (10.02)	-0.0000471 (-0.65)	0.0000617* (2.23)	0.424*** (5.39)	2052.2* (2.26)
<i>Litigation</i>	0.307* (2.30)	0.0820* (2.28)	0.0490*** (3.81)	-3.215 (-0.63)	83863.8** (3.03)
<i>Constant</i>	3.297*** (11.31)	1.590*** (8.56)	0.599*** (18.57)	27.95 (0.85)	-166103.0** (-2.97)
<i>N</i>	6625	6625	6622	6625	6625
<i>R²</i>	0.1218	0.0275	0.0096	0.0030	0.0771
<i>Hausman test</i>	0.0000	0.0000	0.0009	0.9626	0.0000
<i>Model</i>	xtsc	xtsc	xtsc	re	xtsc
<i>Mean VIF</i>	1.70	1.70	1.70	1.70	1.70

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IV. Legal implications for D&O insurance in Taiwan

A. Improving D&O insurance and regulation

The empirical result in this paper indicates that there is a relationship between the purchase of D&O insurance and the quality of corporate governance in Taiwan. If the monitoring function of insurers is expected to develop more in the future, in the long-term the litigation systems and relevant regulations should be improved first. Many details in the regulations and insurance policies in Taiwan are not as complete as the United States. For example, some inconsistencies and conflicts in insurance policies also cause confusion.¹¹² These not only influence the compensation for directors and corporations, but also the incentives to purchase D&O insurance. Also, the signal effect of D&O insurance implies that investors in the market may rely on such information. Thus, the underwriting of insurers and the relevant regulation would be more important. Compared with the United States, the authorities concerned in Taiwan have less experience in supervising the insurer due to the relatively short history of the development of D&O insurance. Even though the evidence proves that no adverse selection problem exists in the current market, relevant regulation will be necessary if these problems occur.

B. Compulsory insurance

Even though D&O insurance is promoted by the authorities in Taiwan, but this study proposes that compulsory D&O insurance may not be necessary in Taiwan. As seen in the previous analysis, the litigation risk to directors and officers is not that high and significant in regression analysis. The main purpose of insurance is indemnifying the loss of the insured.¹¹³ If firms have no risk of being sued and no demand for indemnification, it is unpersuasive to require them to buy insurance. Otherwise, that might conflict with the main purpose of insurance. Moreover, considering the previous empirical results in which D&O insurance is a possible attraction to the market, and this should incentivize firms to purchase D&O insurance and mandatory insurance is not necessary. Hence, this research argues that compulsory D&O insurance rule in Taiwan is suspicious.

C. Limitation on insurance

In the United States, the D&O insurance significantly decreases the deterrence effect of the securities litigation,¹¹⁴ some people such as Janet Cooper Alexander suggest making penalties uninsurable, limiting insurance coverage and thus letting directors pay for themselves to maintain the deterrence effect.¹¹⁵ Similarly, Narjess Boubakri and Nabil Ghalleb test the Canadian market and find that the problem of asymmetric information and moral hazard is obvious.¹¹⁶ Insurer cannot distinguish opportunistic risk or charge

¹¹² See Shih-Ning Lu, *Comments on Directors' and Officers' Insurance in Taiwan*, 43 TAIWAN L. J. 157, 180 (2003).

¹¹³ See 44 C.J.S. Insurance § 2.

¹¹⁴ See Tom Baker & Sean J. Griffith, *supra* note 74, at 831.

¹¹⁵ See Janet Cooper Alexander, *Rethinking Damages in Securities Class Actions*, 48 STAN. L. REV. 1487, 1515 (1996).

¹¹⁶ See Narjess Boubakri & Nabil Ghalleb, *supra* note 66, at 30.

higher premiums to those who have high opportunistic risk. Their evidence also shows that mandatory reporting is not helpful.¹¹⁷ Under such circumstances, regulation and limitation are recommended by them.¹¹⁸ However, the situation in Taiwan is completely different. The maturity and popularity of D&O insurance are far less than in the United States and Canada. Needless to say the problem where D&O insurance over rampant and thus decrease the function of litigation. It should be unnecessary to limit the coverage of D&O insurance to maintain deterrence in current Taiwan. Of course, deductible is helpful for mitigating moral hazard, but compulsory deductibles or limitations on coverage are too much for Taiwan. According to the previous analysis, it is found that the Taiwanese market is close to being homogenous and no evidence supports the existence of asymmetric information and moral hazard. Hence, imposing some limitations on D&O insurance transaction are unnecessary in current Taiwan.

D. Implications for future research

1. The development of D&O insurance in corporate governance in Taiwan

Regarding the prospect of the role of D&O insurance in corporate governance in Taiwan, the possible development could be divergent. For example, D&O insurance could be more prosperous because of the improvement of government and its signal effect. However, when transparency of corporate governance is improved and more mature, D&O insurance would be less important, especially for the purpose of singling. Also, if litigation risk increases, insurance premium will also increase to mitigate the loss of insurer. Due to the increasing premium, firms may try to find other substitutes for D&O insurance. Thus, the prospect of D&O insurance might be suspicious.

A specific answer for this issue still needs for more exploration in the future, but this research may tentatively suggest that the future of D&O insurance might be perceived by the development of litigation system, like shareholder and collective litigation. As mentioned earlier, shareholder litigation does not function actively in Taiwan, and the litigation led by minority shareholder or individual investor is difficult. In this way, the role of Securities and Futures Investors Protection Center would be more important. However, such non-profit organization (NPO) has the purpose to pursue public interest, and maximize social welfare instead of personal welfare.¹¹⁹ NPO usually files lesser litigations than the system led by private attorney.¹²⁰ Furthermore, the Securities and Futures Investors Protection Center is not perfect yet. Its transparency and independence of this protection center has been argued and revolution for this is suggested.¹²¹ For example, the reasons for the decisions and settlement terms should be published,¹²² and

¹¹⁷ *Id.* at 30.

¹¹⁸ *Id.*

¹¹⁹ See Curtis J. Milhaupt, *Nonprofit Organizations as Investor Protection: Economic Theory and Evidence from East Asia*, 29 YALE J. INT'L L. 169, 202 (2004).

¹²⁰ *Id.* at 175. See also Yu-Hsin Lin, *Modeling Securities Class Actions outside the United States: The Role of Nonprofits In The Case of Taiwan*, 4 N.Y.U. J. L. & BUS. 179-80 (2007).

¹²¹ See Wallace Wen-Yeu Wang & Jian-Lin Chen, *Reforming China's Securities Civil Actions: Lessons from Pslra Reform in the U.S. and Government-Sanctioned Non-Profit Enforcement in Taiwan*, 21 COLUM. J. ASIAN L. 115, 151 (2008).

¹²² *Id.* at 151.

the appointment of board should be more independent from the involvement of the authorities.¹²³

Hence, observing the development of litigation system might be a breakthrough point for following research about D&O insurance in corporate governance. If the litigation system is still limited in the future, then the demand for substantial reimbursement from insurance would be not that necessary. Thus, the signal or addressing function might be an important consideration in D&O insurance purchase. In this case, if there is other mechanism improving the transparency of corporate governance, D&O insurance will lose its advantage easily. In contrast, if litigation system is indeed improved, this may cause more litigation risks and more demands for insurance compensation. Thus, even though corporate governance is even more transparent in the future, the basic function for reimbursement might still support the survival of D&O insurance. Conversely, high litigation risk might also cause rising premiums and then make D&O insurance less attractive. It is also possible that insurers are not willing to offer insurance for such high risk. Thus, evaluating the development of litigation system might provide more clues for the future of D&O insurance.

2 Monitoring function from the plaintiff

As noted in introduction, this research tests the monitoring and alternative hypothesis. For the former, this study follows major literature to focus on the mechanisms from insurer, like the offering of D&O insurance, insurance coverage, identity of insurer and so on. However, it is also possible for some monitoring effect which comes from plaintiff and its attorney. In the litigation where plaintiff sues the management of insured firm, D&O insurance provides incentive for the plaintiff and his attorney to monitor the insured firm, to collect more evidence, and then to increase the probability to win the case. The previous empirical works does not include the test for this effect, but some thoughts in this research may be helpful for the following study on this issue.

A possible hypothesis for future research is that the monitoring function from the plaintiff is suspicious, or lesser than the monitoring function from the insurer. Like the analysis in previous section, the litigation system in Taiwan which is not identical to the United States might be a major concern. Litigation led by minority shareholder is still not prosperous, and class action is majorly led by Securities and Futures Investors Protection Center. Such non-profit organization has public interest purpose, which can be found in the criteria in choosing case and avoiding frivolous suits.¹²⁴ Also, Securities and Futures Investors Protection Center recruits full-time attorney with salary for litigation service,¹²⁵ and contingency fee is not allowed in Taiwan. This provides less possibility for the monitoring effect which comes from the eagerness of attorney to win more compensation form D&O insurance coverage. Thus, the observation of litigation system might shed light on the future research about the monitoring effect from plaintiff in D&O insurance.

¹²³ *Id.*

¹²⁴ Securities and Futures Investors Protection Center currently focuses on four types of cases, including making false financial statements, producing false prospectuses, influencing share prices illegally, and insider trading. <http://www.sfipc.org.tw/english/service/03-2.asp> (last visited Jul. 31, 2015).

¹²⁵ <http://www.sfipc.org.tw/main.asp> (last visited Jul. 31, 2015).

3 General model for other jurisdictions

The finding in this paper may also provide a possible theory for other jurisdictions. Like Taiwan, many jurisdictions in East Asia also have the problem of concentrated owner structure, including Thailand, Indonesia, Malaysia, Singapore,¹²⁶ South Korea, Japan,¹²⁷ and Hong Kong.¹²⁸ This may affect these countries' prevalence of shareholder litigation and thus litigation risk of directors. Hence, theory about D&O insurance in Taiwan, explaining the divergence about litigation risk and D&O insurance, may possibly apply to these jurisdictions. It is worth of more researches in the future to find whether the theory in this paper can be generalized to apply to other jurisdictions.

Concluding Remarks

This paper has discussed monitoring hypothesis and tested it within the context of Taiwan. The empirical evidence shows that the monitoring hypothesis is not supported in Taiwan. Firms with good corporate governance and less risk intend to purchase more D&O insurance. In contrast, firms with bad corporate governance and more risk intend to purchase less D&O insurance. A possible alternative explanation of this phenomenon is signal hypothesis. Firms with good corporate governance are usually more concerned about corporate governance. This research also further test signal hypothesis and opportunistic problem. Based on these empirically findings, D&O insurance should not be compulsory and legally capped. In conclusion, characteristics of D&O insurance found in this research are worthy of more notice, no matter in theory, in research, in practice, or in legislative consideration.

¹²⁶ See Nisha Kanchanapoomi, Note, *Accelerating Corporate Governance Reform in Thailand: The Benefits of Private Reform Mechanisms*, 15 S. CAL. INTERDISC. L.J. 165, 185 (2005).

¹²⁷ See Curtis J. Milhaupt, *Nonprofit Organizations as Investor Protection: Economic Theory and Evidence from East Asia*, 29 YALE J. INT'L L. 169, 189-90 (2004).

¹²⁸ See Michael H. Lubetsky, *Cultural Difference and Corporate Governance*, 17 TRANSNAT'L L. & CONTEMP. PROBS. 187, 200 (2008).