Family Holding and Board Effectiveness on Risk-taking: Comparison between Financial Industry in China and Taiwan

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Abstract

Since the financial crisis hit global financial markets and lead global economics into recession, people has had little confidence in the market. It exposed the poor mechanism of internal and external supervision, and the significance of corporate governance is getting noticed. Most enterprises in Taiwan and the Peoples' Republic of China are family holding businesses. This study involves the Taiwanese and Chinese financial industries and examines the influence of family ownership and board effectiveness on risk-taking in both the pre- and post-crisis period. The result shows that there is a significant negative correlation between family ownership and risk-taking. There is also a significant negative correlation between board effectiveness and risk-taking. Bank risk increases significantly in the pre-crisis period, in contrast to the post-crisis period. However, risk-taking of insurance and securities increases significantly in the post-crisis, in contrast to the pre-crisis period. The improvements of board effectiveness in banking, insurance or securities are able to decrease financial risk-taking. In the post-crisis period, the banking in Taiwan and the Peoples' Republic of China can reduce bank risk-taking with the improvements of board effectiveness, but it occurs opposite results in insurance and securities, resulting from the difference of industry characteristics.

Keywords: Family holding, Board effectiveness, Risk-taking, Corporate governance, Financial industry

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I. Introduction

The global financial crisis of 2007-2008 caused Lehman-brother declared bankruptcy, Merrill lynch was takeover, and AIG occurs financial crisis. The global stock and the real estate markets confront collapse, and millions of people lose their work. In that condition, these evidences implicate that the inefficiency of corporate governance. More and more investors progressively recognize the importance of corporate governance, and push firms reform their governance mechanisms. Especially, finance industry is the more special economies, must be more to strengthen the corporate governance and to carry out the risk management of financial institutions, and effective supervision and audit, in order to enhance the effectiveness of corporate governance mechanism.

Corporate governance is the corporate makes the enterprise ownership and management decentralized organizational system to effectively manage activities of enterprises and organizations through legal checks and balances and controls design, in order to prevent drawbacks of corporate law and to pursuit stable business operations development as the goal. In past ownership structure literature, Berl and Means hypothesized the ownership separation that management and ownership should be represented by different persons [10]. However, in other studies showed that American corporate shareholder is not totally separated but concentrated in few family and rich investors [66], [54]. On the other hand, most Asian corporates ownership highly concentrates on family members. According to Claessens et al. [17], they studied 2980 corporates in eight Asian countries and found over half of the corporates ownership is hold by families and over two-thirds are owned by only one shareholder from family. In addition, Yeh et al. [79] studied publicly traded companies in Taiwan and found 76% are owned by family business and the boards are highly controlled by family, which shows Taiwanese corporate ownership are highly concentrated on family firms.

In family holding business, members of board and appointments of higher order management will be influence by affiliate consideration and represented by family members, which make the ownership held by family members and make it more complicated in policies of management and risk-taking, provoking agent problems. When the family interest is consistent with corporate's interest and to maximize the profits of corporate, they tend to cautiously make decisions in order to decrease corporate's risk. However, if the family put their interest before the corporate's interest, family members may make decisions according to their own benefits even

violating corporate governance and exploiting corporate's resource, increasing risk.

Because of the above agency problem, the perfect corporate governance mechanism is obviously more important. Independent directors can help improve the manager's decision and avoid family members exploiting the wealth of the company [52]. Board members can use their expertise and experience to monitor and control the decisions about the company to prevent the huge losses caused by the interest conflicts between company and the family. Therefore, through the supervision mechanism of independent directors and members of the committee can protect the basic rights of shareholders from management conflicts, which has established the confidence of investors, so that corporate governance can maximize the benefits.

In the past, literature studies focused more on corporate governance, family firms, and business performance to examine whether corporate governance impacts corporate performance [7-8], [74-75], but in recent years, due to the Asian financial crisis, the financial crisis, people began to understand the good performance does not mean that the company's business is perfect. It is possible that financial institutions leveraged too much or no strict supervision, which resulting excessive risk of company closed down or financial crisis, making the public began to pay more attention to the company's risk-taking and control. However, there is little research on family ownership and risk-taking in previous studies. Only Pathan [57] studied the effect on the risk-taking of directors and managers in the banking industry, and found that directors and have significant positive relations with bank's risk-taking, while the rights of managers are negatively correlated with bank's risk-taking. Therefore, this paper will focus on the financial industry, discussing the family holding, board of directors' effectiveness and risk-taking.

After the financial crisis, the global economic was downturn and financial institutions take excessive risks, but company did not do well on risk control and the proper management supervision, causing the public confidence crisis toward financial institutions. Therefore, people began to raise awareness of risk and paid more attention to the issue of risk-taking in order to avoid excessive risk of re-occurrence of the situation.

In recent years, the financial industry has faced great transformation and changes. Financial liberalization, internationalization and electronicization make financial industries facing more challenges, which also increasing the risk of banking industries: the financial industry is more competitive in liberalization and internationalization, and also reduce the autonomy of the banks; inter-bank funds exchanges faced great challenges under a high degree of financial product innovation. Since the firewall

between banks and stock markets were removed, financial centers in every country are being turned from financial intermediaries to financial markets but these financial institutions have serious business overlap with each other, which often breeds improper conflict of interest and the interests of the transfer. With long and short-term interest rate structure was irregular changes, the flow is too intense and a credit crunch, increasing the volatility of financial markets [21].

Therefore, how to perfect the corporate governance mechanism while the risk is increasing, the board and the members of the commission at every level have to ensure that the company grow steadily and allow investment to the public confidence in the financial institutions and to protect the power of the company's stakeholders, and effectively control the risk of commitment.

There are three differences between in this paper: (1) In the past, most ownership structure and risk-taking researches focus on exploring the relationship between managers' shareholding and risk-taking, rarely discuss the relationship between family ownership, board effectiveness and risk-taking, so this paper will focus on the impacts of family ownership to risk. (2) The research time of this paper will discuss the impact of financial industry on the risk-taking before and after the financial crisis. (3) In the past, most of the financial industry's risk-taking literatures focus on the firm characteristic variables, so this paper will add GDP growth rate and inflation rate variable into discussion. Therefore, the purpose of this study:

1. To discuss the impact of Taiwan financial industry family holding on the risk-taking.

2. To discuss the effect of the board of directors of Taiwan and Chinese financial industry on the risk-taking.

3. Compare the difference of the impact of the financial industry on the risk-taking between Taiwan and China before and after the financial crisis.

II. Literature Review

2.1 Correlation of the family holding effect

There are different views on ownership structure and operating performance in the past and there are no certain conclusions. Jensen and Meckling [41] proposed "convergence of interest hypothesis". When managers consider holding more, the behavior of them will tend to be rationalized they will make efforts to the supervision

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and management in order to prevent making decisions which harm the company values, because their preference for spending behavior, such as privileged consumption, laziness and pursuit of personal interests for the great principles, will result in increasing or decreasing the wealth of their own. Thus, the larger proportions of managers hold, the less agency problems, which will enhance the company's operating performance. Jensen and Ruback [42] proposed "entrenchment hypothesis", they argued that when management shareholding ratio is large, and the more concentrated ownership managers hold, the more voting power to make their own utility maximization, so managers will strongly oppose a merger or acquisition, because it will make their power, prestige and job insecure. That will induce anti-takeover behavior and discourage equity acquisitions, resulting in business performance and further reduce the value of the natural low and damage the interests of the company and its shareholders. However, Morck et al. [54] proposed "critical hypothesis" which is that when insider ownership ratio is between 5% to 25%, the more interval ownership rate increase, the more the manager has sufficient voting power to consolidate their interests and positions which hurts the corporate's value. but if insider ownership ratio is less than 5% or greater than 25%, then the shareholding ratio increases, the company's value increase, therefore, ownership structure and corporate performance is not linear correlated, but the quadratic relationship.

Recent studies show that most companies ownership are concentrated, and the high proportion of them are family businesses, making their ownership and management united, such as Yeh et al. [79] found that the majority of Taiwan's listed companies' ownership concentrated in the hands of the family, and there is 76% controlled by the family with a high proportion of family-dominated board of directors. Fan and Wong [31] studied of East Asian corporates ownership structure and found the family hold a high degree of control. Weng and Yeh. [77] took 251 domestic listed companies as samples and found the ultimate control patterns of Taiwan listed companies are family-based, 58.2% of them were controlled by the family.

The conclusions are quite different from past studies of family holding impact on business performance in family holding and managed corporates in most countries. (1) Family ownership and performance presented a positive correlation: the higher the family holdings, resulting the right to operate the company and senior management personnel held by the members of the family, the family's wealth and corporate performance is closely related. In addition, the company will cultivate each employee to have altruism and loyalty in order to maintain working stability [48], [53]

and these motives are to reduce the employees for making opportunistic behavior for their own benefits [30], [72] which will endanger the company's operating performance and encourage employees to make a long-term plan for the direction of corporate strategy and reduce the short-sighted managers, to reduce profits of the investment strategy. In order to reduce the risk that the company performance improvement [15], [53]. Demsetz and Lehn [26] found that in ownership and control centralized family enterprises, the insider ownership increases will help to defuse conflicts of interest between managers and shareholders, lowering the cost of supervision and control and enhancing corporate performance. (2) Family ownership and performance presented negative relationship: When family holdings higher, managers may relocate corporate's resources in order to gain more benefits for the corporate, therefore, under the circumstances of family benefits overpass the corporate benefits, the manager may sacrifice the corporate's resources [38] or the family business in order to plan its long-term operation of the business passed down to the next generation, so the funds will be invested in your own company or safer and low-risk standard on the ground, and veto managers to make decisions innovation or investment to avoid financial loss or harm caused by the uncertainty of the company's prestige and wealth, but this will make the company's business and investment strategy too conservative, making the company less competitive situation may have caused the excess assets reduced operating performance. Morck et al. [54] used 371 companies out of 500 large enterprises in 1980 as samples to measure the market value of the company by using Tobin's Q and profitability, carrying out research manager shareholding relationship between the value of the company's market, which found that family control and firm performance has negative relationship.

2.2 Related research on impact of board effectiveness

The purpose of the board is to avoid managers taking the risk of short-sighted investment and damage the reputation and long-term value of the business. In addition, the board can exert the function of management of policy decisions, supervision of investment strategies and risk management, hiring and firing audition of managers, decisions relating to the company's assets bonus, and ensure the quality of financial statements. The board also play the role of mediation between shareholders and stakeholders in order to decrease the risk of corporates and shoulder the responsibility of monitoring corporate regulations.

Previous studies focus much on board size and operating performance but no certain conclusions. (1) Board size and firm performance is positive-related: Bacon [9] found that the efficiency of the board has positive correlation with the size of

board. Larger size of the board, meaning there are many various experts, and it will upgrade the policy qualities, making the soundest management decisions. Chaganti et al. [18] studies also showed that larger board size can enhance the corporate effectiveness. (2) Board size and firm performance is negatively-correlated: Jensen [40] believed when the board size become larger, it is easy to arise internal factions, leading to larger communication costs of binding opinion among members. Furthermore, it may also lead the managers to ask the stakeholders for larger board size in order to consolidate their positions. Yermack [80] study showed that when board size increase, the costs of board members integration will exceed the benefits of the board, which will decrease the firm performance. Therefore, the relationship between board size and firm performance is negative. Singh and Davidson [69] put forward the idea the size and composition of the board. Larger board size exists loss of efficiency. Andres et al. [5] found that smaller board size lead to better firm operating performance. (3) Board size has no significant relationship with firm performance. Huang and Ko. [34] used Taiwan listed companies as samples to study the relationship between board characteristics and firm performance. They found that the number of directors in the board does not have significant impact to firm performance. Mark and Yuan [49] took Singapore companies as samples and found that corporate governance mechanism is endogenous factors, and the proportion of large shareholders has no effect on the company's operating performance by 2 stages of the statistical method.

In most Asian countries, companies usually controlled by the family, especially in Taiwan about 80 % are small and medium companies, which are often inseparable from family holding. Family companies, whether listed or not listed, often have their board composed of family members and have very high proportion of the voting rights through cross-shareholdings and pyramid structures, etc. Therefore, it caused serious information asymmetry, making the family company the management and supervision is often relegated to the black box and the interests of small shareholders also suffered exploitation. In these cases, set the independent directors is particularly important for independent directors can operate their duties to check legal right of the company's financial planning, which will reach the purpose of exposing the real financial situation and stopping from illegal affairs. Therefore, the benefits of minor shareholders and stakeholders such as employees will be secured and that will also prevent large shareholders interest transmission and malicious emptied.

In the past, the studies of the correlation between independent directors' seats and corporate performance have no consistent conclusions. (1) Independent director seats and corporate performance is positively-correlated: Fama [28] proposed

independent directors can provide suggestions for strategic policies which help to improve corporate's economic and financial performance. Pearce and Zahra [59] took Fortune 500 large enterprises in 119 companies as samples and found that the relationship between outside directors and the company's future financial performance is positive. Prevost et al. [60] study also found that the ratio of independent directors and has a positive relationship with the firm's performance. (2) Independent director seats and corporate performance is negatively-correlated: Agrawal and Kneeler [6] used Tobin's Q to measure corporate performance and found that the more seats of outside directors, the worse of the firms' performance. In Taiwan literature, Shieh, T. et al. [65] explored the relationship among the structure of the board, supervisors, and firm performance. She took Taiwan listed companies in the steel industry as samples and found that more seats of outside directors will lead to worse corporate performance. (3) Independent director seats and corporate performance is no-related: Chen [22] study the correlation between outside directors and corporates performance and found there is no significant correlation between outside director seats and firm performance.

Since the Taiwanese family business everywhere, there are many family members holds the position of directors or supervisors. In this case, when the family members may consider their own interests when making decisions and drain the firm's wealth, power or exploitation of minority shareholders of the company. Therefore, the employees and stakeholders will be hurt. Patton and Baker [58] study suggested that when the director is also the manager, he or she may dominate the board under consideration of self-interest and that will reduce the supervision effect of the board. Lin et al. [46] found that when the director is also the manager, the occurrence of financial crises increase. Chen et al. [20] study suggested that when the director is also the manager, it will bring poor monitor performance and make the agent problem worse.

Past shareholding ratio studies show that when shareholding increase, directors and supervisors will have more incentive to supervise the management of the company in order to reduce the company's possible financial crisis under the considerations of the same self-interest with the company. Therefore, Kesner [44] found that the higher proportion of the directors hold, directors and supervisors will have greater incentive to supervise the firm, making a better operating performance. Hsu et al. [36] investigated the effect of corporate governance and financial early warning model and found when directors and supervisors hold higher shares, the directors and supervisor will supervise more effectively so that to reduce the occurrence of financial crises. Hsueh [24] took listed companies from

1996 to 2005 as samples for path analysis and found that when the directors and supervisors hold more shares, they will manage a steady operating profit of accruals to reduce the risks. Fich and Slezak [32] studied the financial crisis company and the characteristics of the corporate governance, they found that when directors hold higher shares, the company's risk of bankruptcy will reduce. Aspect of directors and supervisors pledge ratio, the pledge rate increase will increase its agency problems and the board will exploit the small shareholders and reduce its corporate performance, leading to increased risk-taking of poor performance. Hsiung and Chiou [71] studied the correlation of corporate financial crisis and director share collateralization, he found that when the director share collateralization raised, corporate performance will get worse. Tsai [23] studies 45 domestic banks from 2001 to 2005 and found that when director share collateralization is higher, non-performing loans ratio will become higher, which means the credit rating will get worse because the board will expand their credit or manage scale to increase the firm's risk. These studies also found that the higher director share collateralization will lead to lower operating efficiency and increase the probability of financial crises [36], [78].

2.3 Correlation of financial risk-taking

With the liberalization, internationalization and electronization of the financial sector, and also the innovative financial products, making the financial industry face great challenges. Especially, bank is a particular economy sector, it need to play the role of financial intermediator and regulator, such as lower earnings manipulation behavior of the borrower. In addition, banks should protect the interests of depositors in all kinds' risks. Therefore, it is an important issue for scholars and corporates to execute corporate governance and perform the monitoring and regulating function effectively to improve operating performance and lower down the loss.

There are many literatures investigating the correlation between corporate governance in financial industry and risk-taking. Due to the separation of ownership and management, the agency problems will impact differently to managers, shareholders and directors. For example, manager wealth is human capital and they cannot spread the risk, so the manager will choose safer assets to protect its internal capital [50], [70]. Debt tax shield and bankruptcy capital will affect the manger to choose safer plan instead of risking plans [56]. In addition, if the manager can only receive a fixed salary, they will tend to choose product of lower investment risk because they cannot get extra pay from product profitability, but they may suffer dismissal if the investment fails [61]. In Pathen [57] study of 212 large US banks' board, managers and banks risk-taking in 1997 to 2004, it shows a negative correlation between independent directors and risk, which means independent

directors can decrease the banks risk-taking. In the ownership structure and risk-taking, Amihud and Lev [3] studies investigated the influence of the proportion of the bank manager's holdings to its risk. They found that when the manager holding is high, he or she will choose lower risk due to their own wealth and prestige. However, when the manager holding is low, he or she will be controlled by the shareholder's authority and make they choose risky investments. Saunders et al. [62] studied 38 financial holding companies in the United States and the influence of risk-taking and they found that when the manager holding is high, it will reduce the degree of risk.

III. Research Methods

3.1 Hypotheses and empirical models

This paper, to test the influence of risk-taking, we use the model of risk-taking impact by family ownership and performance of the Board of Directors, propose the following hypotheses and empirical models:

(1) Family holding hypothesis

According to Fama and Jensen [28], the family business will be bear a lower risk than dispersed ownership of enterprises, and choose less risky investments. Chandler [19] proposed companies with a high concentration of ownership will choose to risk aversion. Others noted that family business managers tend to choose lower risk and avoid financial distress in order to accumulate wealth, [37], [63]. Bartholomeusz and Tanewski [11] found that the family business tends to take the lower risk in order to maintain long-established reputation. Finally, Naldi et al. [55] study show that family business would bear less risk than non-family business. So this paper believes that while family ownership increased, family company will have high degree of control, the managers will make more efforts reduce its risks in order to maintain company's long-term business reputation. Therefore, we propose the following hypothesis:

Hypothesis 1: when family ownership is higher, the risk-taking of the company will be lower.

(2) The board effectiveness hypothesis

In terms of the size of the board, smaller size of the board cannot effectively monitor managers, which will reduce the effectiveness of regulatory, so it may produce great probability of financial crises; but if the board size gets larger, directors

may use their expertise and experience to do effective checks and recommendations, so that it will reduce corporates' financial crisis [68]. Similarly, Pathan [57] study also showed that when the board is larger, the risk is reduced. In Taiwan related literature, the Ho and Lee [67] used non-performing loan rate as variable of risk-taking and they found that when the board scale is larger, the risk-taking is smaller. Therefore, this paper proposes the following hypothesis:

Hypothesis 2: when the board size is larger, the risk-taking of the company will be lower.

The majority of the board are nominated by the person within the company, resulting directors in the board cannot really perform their supervisory functions, and when the director's substantive power is lower than the manager's, making it impossible to make effective oversight and propose correct policy guidance [25]. Therefore, the establishment of independent directors to play a supervisory role to reduce the occurrence of risk is very important. Uzun et al. [73] investigated the correlation of the board of director's characteristics and corporate fraud; the results showed that if there are more independent directors in the board, the lower the probability for fraud. Pathen [57] and Bebchuk et al. [13] explored the correlation of the board and risk-taking, found that when the company is making decisions, the independent directors can use their professional experiences and objective positions to give advice, and play roles to balance the interest of shareholders and stakeholders. Independent directors will effectively monitor managers in order to maintain their reputation, therefore holding the higher proportion of independent director's seats, will reduce the risk-taking of banks. Similarly, Minton et al. [51] study a sample of Bank of America, also showed higher proportion of independent directors' seats will reduce the risk. Therefore, we propose the following hypothesis:

Hypothesis 3: when percentage of Independent Directors seats is higher, the risk-taking of the company will be lower.

When a director also served as a manager within the company, he or she cannot make objective decisions, when his or her benefits outweigh the interests of the company, so they may use their own position to empty company wealth or exploit small shareholder's wealth, which will hurt employees and stakeholders. Patton and Baker [58] study suggested that when the director is also served as a manager, he or she may dominate the board under the self-interest considerations, causing the effect of reducing the supervision function of the board. Lin et al. [46] found that when director served as a manager, he or she will increase the company's financial crisis. Therefore, this paper proposes the following hypothesis:

Hypothesis 4: When the ratio of director served as a manager within the company is higher, the risk-taking of the company will be lower.

When the holding rate of directors and supervisors increase, directors and supervisors will have more incentive to try to supervise the company's management and various investment programs when the self-interest with the company-interest are the same, to reduce the company's financial crisis. Hsu et al. [36] investigated the effect of corporate governance and financial early warning model and they found when holding rate of directors and supervisors is higher, directors and supervisors will make more efforts to supervision to reduce financial crises. Similarly, Fich and Slezak [32] studied the impact of characteristics of financial crisis and corporate governance, they also found when the board holds higher share would reduce the company's risk of bankruptcy. Therefore, we propose the following hypothesis:

Hypothesis 5: When the holding rate of directors and supervisors is higher, the risk-taking of the company will be lower.

When directors and supervisors pledge ratio increases, it will lead to agency problems because directors and supervisors will use their positions to exploit small shareholders to reduce corporate performance and increase risk-taking. Tsai and Chang [23] took 45 Taiwan banks from 2001 to 2005 as samples in the study, which showed that the higher the directors and supervisors pledge ratio is, the non-performing loan ratio is also higher and the credit rating is deteriorated. It is because the directors and supervisors will expanse their credit or business scale, increasing the risk of the company. Similarly, other studies also found that the higher directors and supervisors pledge ratio will reduce operating performance, but enhance the probability of financial crises [36], [78]. Therefore, we propose the following hypothesis:

Hypothesis 6: When the directors and supervisors pledge ratio is higher, the risk-taking of the company will be lower.

(3) Multiple regression analysis

For the above hypotheses, this paper presents empirical.

Among them, the following model is to explore the impact of family shareholder on risk-taking in banking industry:

$$NPL_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t} \\ + \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * NPL_{i,t-1} + \varepsilon_{i,t}$$

(3.1)

$$CR_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t}$$
$$+ \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * CR_{i,t-1} + \varepsilon_{i,t} \tag{3.2}$$

$$BIS_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t}$$
$$+ \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * BIS_{i,t-1} + \varepsilon_{i,t} \tag{3.3}$$

The following model is to explore the impact of family shareholder on risk-taking in insurance and securities industries:

$$\sigma_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 GDP_{i,t}$$
$$+ \alpha_6 INF_{i,t} + \alpha_7 D * \sigma_{i,t-1} + \varepsilon_{i,t} \tag{3.4}$$

$$Beta_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t}$$
$$+ \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * Beta_{i,t-1} + \varepsilon_{i,t} \tag{3.5}$$

The following model is to explore the impact of banking board effectiveness on risk-taking:

$$NPL_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t}$$
$$+ \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} \tag{3.6}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * NPL_{i,t-1} + \varepsilon_{i,t}$$

$$CR_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t}$$
$$+ \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} \tag{3.7}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * CR_{i,t-1} + \varepsilon_{i,t}$$

$$BIS_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t}$$
$$+ \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} \tag{3.8}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * BIS_{i,t-1} + \varepsilon_{i,t}$$

The following model is to explore the impact of board effectiveness on risk-taking in insurance and the securities industries:

$$\sigma_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t}$$
$$+ \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} \tag{3.9}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * \sigma_{i,t-1} + \varepsilon_{i,t}$$

$$Beta_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t}$$
$$+ \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} \tag{3.10}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * Beta_{i,t-1} + \varepsilon_{i,t}$$

Where

$\sigma_{i,t}$	is the i company total risk of the t quarter.
$\beta_{i,t}$	is the i company systematic risk of the t quarter.
$NPL_{i,t}$	is the i company non-performing loan ratio of the t quarter.
$CR_{i,t}$	is the i company credit risk of the t quarter.
$BIS_{i,t}$	is the i company the capital adequacy ratio of the t quarter.
$FAMILY_{i,t}$	is the i company family holding rate of the t quarter.
$BSIZE_{i,t}$	is the i company board size of the t quarter.

$INDIR_{I,t}$ is the *i* company percentage of independent directors of the *t* quarter.

$DUAL_{i,t}$ is the *i* company the ratio of director served as a manager of the *t* quarter.

$BSHARE_{i,t}$ is the *i* company the holding rate of directors and supervisors of the *t* quarter.

$PLEDGE_{i,t}$ is the *i* company the directors and supervisors pledge ratio of the *t* quarter.

$Ln(TA)_{i,t}$ is the *i* company firm size of the *t* quarter.

$DEBT_{i,t}$ is the *i* company debt ratio of the *t* quarter.

$ROA_{i,t}$ is the *i* company return on assets of the *t* quarter.

$GDP_{i,t}$ is the *i* country GDP growth rate of the *t* quarter.

$INF_{i,t}$ is the *i* country inflation rates of the *t* quarter.

D as a dummy variable, before the financial crisis is 0, otherwise is 1.

In table 3.1 we show the expected results of independent variable on risk-taking:

Table 3.1 the expected results of independent variable on risk-taking

Independent Variables	Expectations of Risk				
	Total Risk (σ)	Systematic Risk (Beta)	Non-Performing Loan Ratio (NPL)	Credit Risk (CR)	BIS Capital Adequacy Ratio (BIS)
Family Holding (FAMILY)	-	-	-	-	+
Board Size (BSIZE)	-	-	-	-	+
Percentage of Independent Directors (INDIR)	-	-	-	-	+
Duality of Chairman and CEO (DUAL)	+	+	+	+	-
Holding Rate of Directors and Supervisors (BSHARE)	-	-	-	-	+
Directors and Supervisors Pledge Ratio (PLEDGE)	+	+	+	+	-
Firm size (Ln(TA))	-	-	-	-	+
Debt Ratio (DEBT)	+	+	+	+	-
Return on Assets (ROA)	-	-	-	-	+
GDP Growth Rate (GDP)	-	-	-	-	+
Inflationary Rate (INF)	+	+	+	+	-

3.2 The operational definition of variables

This paper uses multiple regression analysis to empirically verify the above hypothesis model and to investigate the effects of family holding and board effectiveness on risk-taking. The definitions of variables are as follows:

(1) Dependent variable

Due to the different risks in each industry, we use the non-performing loan ratio, credit risk and capital adequacy ratio as dependent variables for the banking industry. Relatively, we use total risk and systematic risk as dependent variables for both insurance and securities industry, the operational definitions of variables are as follows:

1. Total Risk

Herein we refer the literature by [4], [57], [62] and use the total risk as the proxy variable of risk-taking:

$$Total\ Risk\ \sigma = \sqrt{\frac{1}{n-1}\sum(x_i - \bar{x})^2} \tag{3.11}$$

Wherein, x_i is the i company's quarter rate of return, $\bar{x}$ is the i company's average quarter rate of return.

2. Systematic Risk

Herein we refer Sharpe [64] and Lintner [47], which proposed capital asset pricing model (the CAPM) assuming that all stock returns can be explained by a single factor in the market, and β is the systematic risk as the proxy variables of risk-taking.

$$ROI_{i,t} = R_{f,t} + \beta_1[ROI_{m,t} - R_{f,t}] + \varepsilon_t \tag{3.12}$$

Wherein,

$R_{f,t}$ is the t quarter risk-free rate of interest (Bank of Taiwan-year deposit rate)

$ROI_{i,t}$ is the t quarter rate of return of i stock

β_1 is the i company's beta value

$ROI_{m,t}$ is the t quarter rate of return of m market

ε_t is the error term

3. Non-Performing Loans Ratio

Non-performing loan ratio is an important indicator to assess the quality of the bank's lending. When non-performing loan ratio is higher, the quality of the bank's lending and security is worse, which will cause the public panic in withdrawals. So banks will pursue low non-performing loan ratio in order to avoid high bad debt and increase the risk-taking of banking industry. Cebenoyan et al. [16] and Barth et al. [10] used non-performing loan ratio as a proxy variable of risk-taking to measure the impact of corporate governance on risk-taking. Therefore, non-performing loan ratio is defined as the ratio of overdue loans (include overdue receivables) to total loans (include overdue receivables).

$$NPL = \frac{Overdue\ Loans}{Total\ Loans} \tag{3.13}$$

4. Credit Risk

Jeitschko and Jeung [39] used ratio of risk assets to total assets to measure risk. Jokipii and Milne [43] also used credit risk as the proxy variables of risk-taking to study the risk capital buffering and risk-adjusted decision, so this paper assume credit risk as the proxy variables of risk-taking.

$$CR = \frac{RWA}{TA} * 100\% \tag{3.14}$$

Wherein, RWA = (0.25 * Interest Bearing Balances) + (0.10 * Short-term US Treasury and Government Agency Debt Total Securities) + (0.50 * State and local Government Securities) + (0.25 * Bank Acceptances) + (0.25 * Fed Funds Sold and Securities Purchased Under Agreements to Resell) + (0.75 * Standby Letters of Credit and Foreign Office Guarantees) + (0.25 * Loan and Lease Financing Commitments) + (0.50 * Commercial Letters of Credit) + (All Other Assets), and $TA = Total\ Assets$.

5. BIS Capital Adequacy Ratio

BIS capital adequacy ratio is used to measure the ability of the risk-taking of own capital in the financial institution. When the capital adequacy ratio is high, the company operates more robust and the capital is safer, the capacity of risk-taking and solvency is higher, and it also reduce the risk of the financial institution. In 1988 the Basel Committee set a capital adequacy ratio and it should keep the ratio at least 8% of the minimum standard to ensure the financial institution of excessive manipulation of risky assets and the occurrence of excessive risk-taking. In Taiwan banking law, it also requires the capital adequacy ratio must meet the 8% standard. Therefore, this paper uses the capital adequacy ratio as the proxy variables of risk-taking.

$$BIS = \frac{Core\ Capital}{Risk - Weighted\ Asset} * 100\% \tag{3.15}$$

(2) Independent variable

The operational definition of independent variables of the empirical model used in this paper are as follows:

1. Family Holding: in this paper, based on Taiwan Economic Journal database (TEJ), family holding is defined as the sum of family individual holdings, family unlisted holdings, family foundations, and family listed holdings.

2. Board Size: measured as the total number of members in the board of directors.

3. Percentage of Independent Directors: measured as the ratio of independent directors in the total members in board of director.

4. Duality of Chairman and CEO: in the directors within the company managers accounted for the ratio of the number of seats all the directors of the measure.

5. Holding Rate of Directors and Supervisors: measured by the number of shares to directors and supervisors of the company's outstanding shares ratio of the number of ordinary shares.

6. Directors and Supervisors Pledge Ratio: measured by pledge of shares of directors and supervisors accounting for the ratio of the number of shares held by directors and supervisors.

(3) Control variable

1. Firm Size

According to Anderson and Fraser [4], Pathan [57] study, the larger size of the company will lead to the bank to the bear smaller the risk. Therefore, this paper use company's total assets logarithmic to measure.

$$Firm\ Size = Ln(Total\ Assets) \tag{3.16}$$

2. Debt Ratio

According Akhibge and Martin [2] study of the US governance disclosure of information on the impact of risks in financial industry, they also use debt ratio as a control variable. In addition, Lev [45] found that under the high debt ratio will make the stock compensation variation large, resulting in an increase of the risk-taking. This paper is based on liabilities divided by assets to measure.

$$Debt\ Ratio = \frac{Date}{Assets} * 100\% \tag{3.17}$$

3. Return on Assets

According to Hsu et al. [76], they study the relationship between return on assets and risk-taking and found the assets rate of return and risk is negatively correlated. It was probably because of the financial industry are in a highly competitive environment, the better constitution company will have a higher chance to win a high return and low risk investment options. Therefore, this paper based on the ratio of net profit after total assets to measure.

$$ROA = \frac{Net\ Income}{Total\ Assets} * 100\% \qquad (3.18)$$

4. GDP Growth Rate

According Agoraki [1], they found that when GDP growth rate is higher, the banks will reduce the risk. Therefore, this paper will take GDP growth rate as total control variable.

$$GDP = ln\left(\frac{GDP_t}{GDP_{t-1}}\right) \qquad (3.19)$$

5. Inflationary Rate

According to Boyd et al. [14], it showed that when the inflation rate increase, the bank will choose to bear higher risks. So this paper will use inflationary rate as total control variable of risk-taking.

$$INF = ln\left(\frac{CPI_t}{CPI_{t-1}}\right) \qquad (3.20)$$

Wherein the CPI_t: is t Consumer Price Index for the quarter; the CPI_{t-1}: The first $t-1$ Consumer Price Index for the quarter

3.3 study period and data

This paper mainly investigates the effects of family holding and board effectiveness to risk-taking before and after the financial crisis. The research data collection and screening criteria is the Taiwan public offering financial industry (including banking, insurance and securities), of which there are a few banks by merger or takeover, and the insurance industry has been turned holding, as well as the securities industry those has been merged into the financial holding and exclude incomplete impacting information. So the final number of samples 23 from the banking industry, 7 from insurance industry and 11 from securities industry within the study period from second quarter in 2005 to third quarter in 2010, which was divided by the financial tsunami of second quarter in 2005 to second quarter in 2008 and third quarter in 2008 to third quarter in 2010.

The paper took listed financial industries in Shanghai and Shenzhen, China, as samples and exclude the incomplete information, so the final number of samples are 14 firms in banking industry and 9 firms in securities industry within the study period from fourth quarter in 2007 to third quarter in 2010, which also divided by the financial tsunami into fourth quarter in 2007 to second quarter in 2008 and third

quarter 2008 to third quarter in 2010. In this study, the empirical model of the strain number of independent variables and control variables are taken from TEJ, which China data of family holding, holding rate of directors and supervisors and directors and supervisors pledge ratio didn't disclose in TEJ, so the three variables above will not discuss in China part of the empirical results.

In this paper, we use SPSS statistical software as the statistical tools for analysis. First we discuss the descriptive statistics of each variable. Then we explore the correlation between the variables by following Pearson correlation matrix, and remove the common grave of linear variable. Finally, we perform multiple regression analysis in cross-section and time series data, and analyze the empirical results.

Table 3.2 Sample of Taiwan and China's financial industries

	Taiwan's financial industry			Number
banking	Bank of Kaohsiung	Ta Chong Bank	King's Town Bank	23
	E. Sun Commercial Bank	Yuanta Commercial Bank	KGI Commercial Bank	
	Hua Nan Commercial Bank	Taichung Commercial Bank	Chang Hwa Commercial Bank	
	Union Bank of Taiwan	Bank SinoPac	CTBC Commercial Bank	
	First Commercial Bank	Entie Commercial Bank	Taishin International Bank	
	Taipei Fubon Commercial Bank	Taiwan Cooperative Commercial Bank	China Development Industrial Bank	
	Mega International Commercial Bank	Cathay United Commercial Bank	Taiwan Business Bank	
	Far Eastern International Bank	JihSun International Commercial Bank		
Insurance	Central Reinsurance	Shinkong Insurance		7
	China Life Insurance	Taiwan Fire & Marine Insurance		
	Taiwan Life Insurance	Union Insurance		
	The First Insurance			
Securities	Masterlink Securities	Horizon Securities		11
	KGI Securities	Taiwan Int'l Securities		
	Capital Securities	Ta Chong Securities		
	Polaris Securities	Concord Securities		
	Tachan Securities	President Securities		
	Ta Ching Securities			
	China's financial industry			Number
banking	Shenzhen Develop Bank	China Merchants Bank	Industrial and Commercial Bank of China	14
	Bank of Ningbo	Bank of Nanjing	China Construction Bank	
	Shanghai Pudong Development Bank	Industrial Bank	Bank of China	
	Hua Xia Bank	Bank of Beijing	China Citic Bank	
	China Minsheng Banking	Bank of Communications		
Securities	Hong Yuan Securities	Changjiang Securities	Southwest Securities	9
	Northeast Securities	CITIC Securities	Haitong Securities	
	Guoyuan Securities	Sinolink Securities	The Pacific Securities	

IV. Empirical results of Taiwan's financial industry

4.1 Descriptive statistical analysis

Table 4.1 show the comparison of the board effectiveness in Taiwan banking industry before and after the financial crisis. The average of independent director seats ratio raised substantially from 3.46% to 16.71% after the crisis, while the directors and supervisors shareholding ratio increased from 63% to 65.28%. In family holding ratio, it decreased slightly from 38.75% to 34.85% and the risk-taking part, non-performing loans ratio and credit risk are slightly decreased but capital adequacy ratio slightly increased after the financial crisis.

In Table 4.2, there is a comparison of board effectiveness in Taiwan's insurance industry before and after the financial crisis. The average of the board scale increased from 7.98 to 9.11 members in the board and the average of independent director ratio is also raised significantly from 3.80% to 22.99%. The director and supervisor ratio decreased slightly from 23.03% to 19.38% after the financial crisis. Standard deviation of the return on assets decreased sharply from 335% to 124.38%, meaning that the fluctuation of the return on assets decreased a lot after the financial crisis while the average of total risk and the systematic risk are higher after the crisis.

Table 4.3 displayed the comparison of the board effectiveness in Taiwan's securities industry. The average size of the board increased slightly from 9.45 to 10.29 persons while the average of independent director seats ratio increased from 10.79% to 22.76% after the financial crisis, same as the banking and insurance industries. In the risk-taking part, the average of total risk and systematic risk are higher after the financial crisis.

4.2 Correlation statistical analysis

Table 4.4 show non-performing loans ratio is negatively related to family holding, independent director ratio and director and supervisors shareholding. Credit risk and scale of the board are negatively correlated, capital adequacy ratio and board scale are positively related to directors' shareholding. Table 4.5 show Taiwan's insurance industry that total risk and systematic risk are significantly positive-correlated to directors and supervisors pledge ratio. Table 4.6 show Taiwan securities industry that the total risk is associated with the independent director seats ratio presented in significant positive correlation, and the systematic risk presents significant negative correlation with director scale. Therefore, Taiwan financial industry, including

banking, insurance and securities, correlation coefficient show under 0.7 indicates no serious collinearity between explanatory variables.

4.3 Multiple regression statistical analysis

From Table 4.7 we can learn that impact of Taiwan banking family holding to non-performing loan ratio and credit risk, the correlation coefficients were -0.003 and -0.033 and reached 1% significant level, which indicating that the higher rate the family holdings, the lower is the non-performing loan ratio in banking industry. In the same way, when the family holding is higher, the credit risk of the banking industry is lower. Table 4.8 show that affect the family holdings to total risks in Taiwan insurance industry, including regression coefficient was -0.102 up to 5% significant level, means that when family holding rate is higher, the overall risk is lower in insurance industry. Table 4.9 show that impact of family holdings to systemic risk in Taiwan's securities industry, which the regression coefficient is -0.004 with 1% significant level, indicating that the higher family holding is, the lower is the systematic risk in securities industry. The above results are in consist with Bartholomeusz and Tanewski [11], which show that when family holding is high, the family will have better control and will use the power to guide, control and monitor the manager's decision in order to prevent managers making excessive risk decisions. The results are in consist with the expectation of the study so the hypothesis 1 is supported.

In the board size, Table 4.11 show effect of the board size to the credit risk, the regression coefficient is -0.519, reaching 1% significant level, indicates that when the size of the board is greater, the lower is the credit risk in banking industry. Similarly, the impact of board size to capital adequacy ratio in Taiwan banking industry, the regression coefficient is 0.042, reaching 10% significant level, indicates that when the size of the board is greater, the banking capital adequacy ratio is higher. Table 4.14 show that effect of the board size to systemic risk in Taiwan insurance industry, the regression coefficient value of -0.029, reaching 5% significant level, indicates that when the board size is greater, the systematic risk is lower. The results above are in consist with Simpson and Gleason [68], Pathan [57] the study's expectation, which the hypothesis 2 is support.

In independent director's seats ratio, table 4.10 show that effect of independent seats ratio to non-performing loan ratio in Taiwan banking industry, where the regression coefficient is -0.015 reaching 1% significant level, and that means that when the independent director seats ratio gets higher, the non-performing loan ratio will become lower. Therefore, when the independent director seats ratio is high, they

can make effective supervision and suggestion basing on their profession and experiences, which will lower down the risks. The empirical results are in consist with studies of Pathen [57], Minton et al. [51] and the study's expectation, so the hypothesis 3 is supported.

In duality of chairman and CEO, Table 4.10 show the effect of duality of chairman and CEO ratio to non-performing loan, where the regression coefficient is 0.007 up to 5% significant level, indicates that when duality of chairman and CEO ratio is higher, the non-performing loan will be higher. Therefore, the directors may use their positions to make unfavorable decisions, increasing the firm's risk. The empirical results are in consist with the studies of Lin et al. [46] and the study's expectations, so the hypothesis 4 is supported.

In the holding rate of directors and supervisors, Table 4.10 show the effect of holding rate of directors and supervisors to non-performing loans ratio in Taiwan banking industry, where the regression coefficient of -0.005 up to 1% significant level, indicating that when the holding rate of directors and supervisors is higher, the non-performing loan will be lower. Table 4.11 show the effect of holding rate of directors and supervisors to credit risk in Taiwan banking industry, where the regression coefficient of -0.027 up to 5% significant level, indicating that when the holding rate of directors and supervisors is higher, the credit risk will be lower in the banking industry. Table 4.14 show the effect of the holding rate of directors and supervisors to systematic risk in Taiwan insurance industry, where the regression coefficient is -0.006 up to 5% significant level, indicating that when the holding rate of directors and supervisors is higher, the systematic risk will be lower. Similarly, Table 4.15 show the effect of the holding rate of directors and supervisors to total risk in Taiwan insurance industry, where the regression coefficient is -0.156 up to 10% significant level, indicating that when the holding rate of directors and supervisors is higher, the total risk will be lower. The above results show when the holding rate of directors and supervisors is high, directors and supervisors will make more efforts to supervise the manager's decision in order to prevent loss from agent problems and decrease the possibility of financial crisis of the corporates. The empirical results are in consist with the study of Fich and Slezak [32] and this study, so the hypothesis 5 is supported.

In directors and supervisors pledge ratio, Table 4.11 show the effect of directors and supervisors pledge ratio to credit risk in Taiwan banking industry, where the regression coefficient is 0.046 of 1% significant level, indicating that when the directors and supervisors pledge ratio is higher, the credit risk will be higher in

Taiwan banking industry. Table4.12 show the effect of directors and supervisors pledge ratio to BIS capital adequacy ratio in Taiwan banking industry, where the regression coefficient is -0.019 up to 5% significant level, indicating when the directors and supervisors pledge ratio is higher, the capital adequacy ratio will be lower. Table 4.15 show the effect of directors and supervisors pledge ratio to total risk in Taiwan securities industry, wherein the regression coefficient is 0.133 of 1% significant level, indicating that when the directors and supervisors pledge ratio is higher, the total risk will be higher. Similarly, Table 4.16 show the effect of directors and supervisors pledge ratio to systematic risk in Taiwan securities industry, where the regression coefficient is 0.005 of 1% significant level, indicating that when the directors and supervisors pledge ratio is higher, the systematic risk will be higher. The above results show that when the directors and supervisors pledge ratio is high, directors and supervisors' needs for capital will be high so they may use their positions to exploit the small shareholders and take their shares to the bank mortgage in order to expand credit scale of operation, resulting in increased risk of the company and enhance the occurrence of financial crises. The empirical results are in consist with studies of [36], [78] this study's expectations, so the hypothesis 6 is supported.

In control variable, the company size is negatively correlated with banking non-performing loan, credit risk and total risk in securities industry and positively correlated with capital adequacy ratio. That is, when the company size gets larger, banking non-performing loan, credit risk and total risk in securities industry will be lower while the capital adequacy ratio will be higher. The empirical results are in consist with studies of Anderson and Fraser [4], Pathan [57] and this study's expectations. However, the company size is positively correlate with systematic risk of securities industry, consisting with studies of Jeitschko and Jeung [39], which means a large-scale company will be more likely to have a high risk investment behavior to expand the company while shouldering more risk. Debt ratio and credit risk in banking industry is positively- correlated and negatively-correlated with capital adequacy ratio, which means that when the debt ratio is higher, credit risk in banking industry and total risk in securities industry are higher while the capital adequacy ratio in banking industry is lower. The empirical results are in consist with the study of Lev [45] and this study's expectations. However, the debt ratio and systematic risk in securities industry is negatively correlated, which is contrary to this study's expectations. In Hsiao [35] study, when the company's financial leverage increased, the company may invest more assets in hedge transactions, leading to deceased company's systematic risk. Return on assets is negatively correlated to non-performing loan ratio of the banking industry and credit risk. The results are in consist with studies of Hsu et al. [76] and this study's expectations. However, return

on assets is positively correlated to systematic risk in securities and insurance industry. It may be possible that the company choose the high return high risk capital portfolio in order to make more profits while shouldering more risks.

GDP growth rate is positively correlated to banking's non-performing loan ratio, credit risk and capital adequacy ratio. Similarly, it is negatively correlated to insurance's total risk and securities' systematic risk. When the CDP growth rate is high, banking's non-performing loan ratio, credit risk and capital adequacy ratio will higher while the insurance's total risk and securities' systematic risk will be lower. The empirical results are in consist with studies of Agoraki [1] and this study's expectations. Lastly, the inflation rate is positively correlated to non-performing loan and systematic risk in banking industry and it is also positively correlated to systematic risk and total risk in securities industry. The empirical results are in consist with studies of Boyd et al. [14] and this study's expectations.

In addition, the paper also made a comparison before and after the financial crisis. Table 4.11 show the empirical results that former credit risk presented a significant negative correlation to the current credit risk in banking industry. Similarly, Table 4.12 presents a former capital adequacy ratio is significantly in negative correlation to the current capital adequacy ratio, which means the banking industry shoulder less risk after the financial crisis comparing to the situation before the financial crisis. It shows that after the outbreak of financial crisis, cooperates in banking industry strengthened the internal and external governance mechanism and became more stringent in risk management and for prudent checks

In the insurance industry, Table 4.13 and 4.14 show the empirical results that former total risk and systematic risk are in positive correlation to current total risk and systematic risk. Similarly, Table 4.15 and 4.16 show former total risk and systematic risk are in positive correlation to current total risk and systematic risk in securities industry. That is, insurance and securities industries bear much more risk after the financial crisis. According to Huang [33], after the outbreak of financial crisis, financial asset prices fell sharply, credit collapsed, financial institutions facing with investment losses, asset impairment, asset ROI decrease, so there was a systematic crises and risk of default making insurance industry bear huge risky pressure. Therefore, insurance and securities industries can't quickly reduce the risk in the short term after the financial crisis.

Through the results of this study, we found that board effectiveness improvement does help to reduce risk-taking in Taiwan's financial industry, whether it is banking, insurance or securities. The increase of board size, independent director seats ratio

and holding rate of directors and supervisors and the decrease of duality of chairman and CEO and directors and supervisors pledge ratio will help to enhance board effectiveness. Therefore, good internal and external governance mechanism that can improve the company's performance and to strictly monitor any managers' decision-making in order to avoid increasing the risk of harm to the company's long-term business reputation and harm to the rights of interested parties.

V. Empirical results in China financial industry

5.1 Descriptive statistical analyses

Table 5.1 show a comparison of board effectiveness before and after the financial crisis by showing the directors increased from 16.5 to 16.27 persons, independent seats ratio increased slightly from 32.9% to 33.78%, duality of chairman and CEO ratio decreased from 20.44% to 19.06%. In terms of risk-taking, the average of non-performing loan ratio decreased from 1.95% to 1.21%, average credit risk increased slightly from 55.43% to 56.29% and capital adequacy rate decreased from 13.61% to 11.85% after the financial crisis.

Table 5.2 is a comparison before and after the financial crisis of total risk. There was a sharply decreased from the average of 129.29 to 40.78 and the average of systematic risk deceased from 1.35 to 1.24 after the financial crisis. In board effectiveness, the board size slightly increased from average 11.78 to 11.84 persons, independent director seats ratio increased from 24.28% to 36.5%, duality of chairman and CEO ratio decreased slightly from 12.55% to 11.35%. Therefore, we can learn that after the financial crisis, China securities industry decreased the total and systematic risks by enhancing the board effectiveness.

In short, board effectiveness, no matter in banking or securities, were enhanced in China financial industry after financial crisis. In addition, total risk, systematic risk and non-performing loan ratio were all decreased after the financial crisis.

5.2 Correlation statistical analyses

Table 5.3 show the size of the board and independent director seats ratio are in negative correlation to non-performing loan ratio in China banking industry, independent director seats ratio is negatively correlated to credit risk, duality of chairman and CEO ratio is negatively correlated to non-performing loan rate ratio and credit risk, but in positive correlation to capital adequacy ratio.

Table 5.4 show the total risk is negatively-correlated to percentage of independent directors in China securities industry. In the control variable, the total risk is also in negative correlation to the company's size. In general, the correlation coefficient is no higher than 0.7 between China's banking and securities industries, showing that there is no serious collinearity between explanatory variables.

5.3 Multiple regression statistical analysis

Table 5.5 show the effect of board size to non-performing loan ratio in China banking industry, which the regression coefficient is -0.079 up to 5% significant level, indicating that when the size of the board is greater, the lower is the banking non-performing loan; in the same manner, Table 5.7 show the effect of the board size to capital adequacy ratio in China banking industry, which the regression coefficient was 0.159 up to 5% significant level, indicating that the larger size of the board is, the higher is the capital adequacy ratio. So the above empirical results indicate when the number of directors gets more, the board can use its expertise and experiences to perform oversight managers to reduce excessive risk-taking, which results are in consist with Pathan [57] and this study's expectations, so the hypothesis 2 is supported.

In percentage of independent directors, Table 5.5 show the effect of percentage of independent directors to non-performing loan ratio in China banking industry, where the regression coefficient was -0.043 up to 1% significant level, indicating that higher percentage of independent directors will lead to lower non-performing loan ratio. Table 5.6 show the effect independent directors' percentage to credit risk, which the regression coefficient was -0.745 and up to 1% significant level, indicating that the higher percentage of independent directors, the lower is the credit risk in banking industry. Table 5.7 show the effect of percentage of independent directors to capital adequacy ratio, where the regression coefficient was 0.159 and up to 1% significant level, indicating that the higher percentage of independent directors, the higher is the capital adequacy ratio in China banking industry.

Similarly, Table 5.8 show the effect of percentage of independent directors to total risk in China securities industry, which the regression coefficient was -2.516 and up to 1% significant level, indicating that the higher is the percentage of independent directors, the lower is the total risk in securities industry. Table 5.9 show the effect of percentage of independent directors to systematic risk in China securities industry, where the regression coefficient was -0.01, and up to 10% significant level, indicating that higher is the percentage of independent directors, the lower is the systematic risk in securities industry. That is to say, when there are more independent directors in the

board, they will play fully independent roles to supervise managers' decision in order to protect the rights of interested parties. The results are in consist with [51], [57], [73] and this study's expectations, so the hypothesis 3 is supported.

In the duality of chairman and CEO, Table 5.5 show the effect duality of chairman and CEO ration to non-performing loan ratio in China banking industry, where the regression coefficient is -0.052, and up to 5% significant level, indicating that the higher duality of chairman and CEO is, the lower non-performing loan ratio is. Table 5.6 show the effect of duality of chairman and CEO to credit risk, where the regression coefficient is -0.521 and up to1% significant level, indicating that the higher duality of chairman and CEO is, the lower the credit risk is. Similarly, Table 5.7 show the effect of duality of chairman and CEO to capital adequacy in China banking industry, where the regression coefficient is 0.113 and up to 1% significant level, indicating that the higher duality of chairman and CEO is, the higher the capital adequacy is.

The above results of non-performing loan ratio, credit risk and capital adequacy in China are in contrary to this study's expectations, so the hypothesis 4 doesn't be supported. The possible reasons may be when the chairmen are also the CEOs, they need to be responsible to their decisions and maintain the long-term business reputation of the family business, so they will tend to make prudent decisions for the company in order to reduce risk. Similarly, Donaldson and Davis [27] believed that the manager needs to be responsible for the company's performance so the duality of chairman and CEO can earn the full support of the board and to control internal information by using their positions, helping to perform supervision mechanism, enhance corporate value and shareholders, and reduce their risk.

In control variable, the company size is in significantly negative correlation to banking credit risk and securities total risk, which means when the company size is larger, the credit risk is low in banking industry while the total risk is low in securities industry. The empirical results above are in consist with Anderson and Fraser [4], Pathan [57] and this study's expectations. However, the company size and the non-performing loan ratio are positive-correlated and contrary to this study's expectations.

Debt ratio is positively correlated to banking industry's credit risk and securities industry's risk in China, which means that when the debt ratio is high, the credit risk in banking industry is high and the total risk in securities industry is also high. Besides, the debt ratio in China banking industry is significantly negative correlated to capital adequacy ratio, indicating that when the debt ratio is high, the capital

adequacy ratio will be low. The empirical results above are in consist with this study's expectations. Return on assets is in significant negative correlation to the total and systematic risk in securities industry, which means that when the return on assets is high, the total and systematic risk is low in securities industry. The empirical results are in consist with this study's expectations. GDP growth rate is in significant negative correlation to total risk in securities industry, which means when the GDP growth rate gets higher, the total risk become lower. This result is in consist with this study's expectation. Inflationary rate is in significant positive correlation to non-performing loan ratio in banking industry and total risk in securities industry, which means when the GDP growth rate is high, the non-performing loan ratio in banking industry and total risk in securities industry are high. The results are in consist with this study's expectations.

Finally, this study made a comparison of risk-taking before and after the financial crisis by Table 5.5, showing there is a significant negative correlation between former non-performing loan ratio and current non-performing loan ratio. Therefore, we can learn that the effect of risk-taking is banking industry is lower after the financial crisis. It is because the banks strengthen the corporate governance mechanism, especially in enhancing the effectiveness of the board, which reduced the risk effectively. However, the effect of risk-taking in securities industry is not significant before and after the financial crisis.

Form Taiwan and China empirical results, we found that the results of effectiveness of the board in securities industry are similar, indicating that the banks pay more attention to corporate governance mechanisms in particular to strengthen the effectiveness of the board after the financial crisis. Therefore, the increased of the board size and the percentage of independent directors can effectively lower down the risk-taking in banking industry while the effect of duality of chairman and CEO ratio to risk-taking showed the opposite results between Taiwan and China.

VI. Conclusion

6.1 Conclusions

The financial crisis occurred, impacting the global financial markets, and sparked the market's high degree of distrust and revealed the internal and external supervision mechanisms in firms. Especially in Taiwan and China, there are many family corporates, which makes it important to strengthen the effectiveness of the board in order to show the effect of check and balance, preventing the manager to make risky

behaviors. Previous literature discussed mostly on the relationship among family holding, corporate governance, and operating performance. There are few studies focus on the relationship among family holding, board effectiveness and risk-taking. Therefore, the study focused on the financial industry and study the influence of family holding and board effectiveness toward corporates' risk-taking. Furthermore, the study explored the impact of economy crisis to financial industry in Taiwan and China.

The study took Taiwan's financial industry as a sample to investigate the effect of family holding to financial industry's risk-taking. The empirical results show there is a negative correlation between Taiwan banking family holding and credit risk; Similarly, there is a negative correlation between Taiwan insurance family holding and total risk, so as to Taiwan securities industry family holding. The results above are consistent with the former studies and meet the expectation of this study.

This study took Taiwan and China financial industry as samples to discuss the impact of board effectiveness to industrial risk-taking. In Taiwan, the empirical result show that the board scale in banking is negatively-correlated with credit risk and positively-correlated to capital adequacy ratio. The ratio of independent directors' seats is significantly positive correlated to overdraft ratio. The ratio of directors and managers is significantly positive correlated to overdraft ratio, while the director and supervisors shareholding is negatively correlated to overdraft ratio. Directors and supervisors pledge rate is and positively correlated to credit risk and negatively correlated to capital adequacy ratio. In insurance industry, both boards scale and directors and supervisors shareholding are negatively-correlated to systematical risk. On the other hand, directors and supervisors shareholding ratio is negatively-correlated to total risk in securities industry.

In Chinese financial industry, the board scale in banking is negatively-correlated with overdraft ratio and positively-correlated to capital adequacy ratio. The ratio of independent directors' seats is significantly negatively correlated to overdraft ratio while it is positively correlated to capital adequacy ratio. The ratio of directors and managers is significantly negatively correlated to credit risk and positive correlated to overdraft ratio. In securities industry, the ratio of independent directors is negatively correlated to total risk and systematic risk.

The results of the impact of board effectiveness to financial industry's risk-taking listed above are mostly in consist with former studies and our expectations. However, the result of the impact of the ratio of Chinese directors and supervisors to risk-taking is different from our expectations. The reason may be the managers are responsible

for their policies so they make prudent and low-risk decisions in order to maintain the family's long-term business reputation.

This paper discusses the differences between Taiwan and China before and after facing the financial crisis and the results show that both Taiwan and China banking risk-taking effect are significantly higher before the financial crisis than after it. That means banking industry pay more attention to firm's internal and external governance mechanism after the financial crisis and check stricter to the risk management, especially in the aspect of independent director ratio. Though Taiwan had set the independent director seats limit in Securities and Exchange Act in 2006, the study found the seats increased significantly after the financial crisis, which means that strengthening board effectiveness can increase the role of supervision and advisory so the managers would not likely to do illegal or risky decisions.

However, the situation in Taiwan is that insurance and securities industry are having higher risk-taking effect after the outbreak of the financial crisis. It may be possible that financial asset prices fell sharply after the outbreak of the financial crisis and the financial institutions were facing investment losses, asset impairment, assets ROI decreased effects, so there were systematic crisis and default risk, which made the insurance and securities industry under a lot of pressure.

Last but not least, the study suggested that no matter in Taiwan or China, the elevation of board effectiveness and independent director seats ration can effectively reduce financial risk. Financial industry would provide a more robust operating and maintaining a good corporate reputation by strengthening the effectiveness of the board in order to reduce the manager's risky decisions after the outbreak of the financial crisis.

6.2 Future studies and recommendations

1. The study is to investigate the influence of Taiwan and China family holding to board effectiveness, but in TEJ the Chinese part of family holding, directors and supervisors' shareholding, and pledge rate data are missing so they can't be discussed in the study. Therefore, we expect TEJ will provide more complete database for future studies.

2. The data collected in this study is based on Taiwan public offering banks, but there are many government-owned banks in Taiwan. Therefore, it is recommended that further research can compare the official banking and private banks before and after the outbreak of the financial crisis.

3. The study integrated banking, insurance and securities industries, but recent years the financial industry is effected by internationalization and liberalization, which makes it facing intense competition, so Taiwan's financial institutions try to promote financial holding company in order to enhance competitiveness. Therefore, further studies are suggested to compare financial holding company and non-financial holding company respectively in the wake of the financial crisis risk.

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Table 4.1 Descriptive statistics of Taiwan's banking industry

All period (2005/06/30-2010/09/30)					
	N	Minimum	Maximum	Mean	Std.
Non-Performing Loans Ratio (NPL)	506	0.2900	5.4400	1.6120	0.8652
Credit Risk (CR)	506	45.7261	112.9629	64.0409	8.3652
BIS Capital Adequacy Ratio (BIS)	506	0.9700	37.1600	11.3785	4.1513
Family Holding (FAMILY)	506	0.0000	100.0000	37.0469	42.4019
Board Size (BSIZE)	506	6	21	12.5900	3.5420
Percentage of Independent Directors (INDIR)	506	0.0000	44.4444	8.8810	11.8288
Duality of Chairman and CEO (DUAL)	506	0.0000	55.5600	14.6953	11.1110
Holding Rate of Directors and Supervisors (BSHARE)	506	0.0000	100.0000	63.9360	39.2682
Directors and Supervisors Pledge Ratio (PLEDGE)	506	0.0000	100.0000	7.28741	20.6287
Company Size (Ln(TA))	506	18.7022	21.6717	20.2139	0.8722
Debt Ratio (DEBT)	506	32.8306	99.1712	91.98427	10.1787
Return on Assets (ROA)	506	-446.0000	271.0000	-4.70158	57.3010
GDP Growth Rate (GDP)	506	-8.5600	13.5900	4.2909	5.8734
Inflationary Rate (INF)	506	-1.9800	4.9700	1.3414	1.7454
Before the financial crisis (2005/06/30-2008/06/30)					
Non-Performing Loans Ratio (NPL)	299	0.4300	5.4400	1.8678	0.9124
Credit Risk (CR)	299	47.7507	112.9629	65.9910	9.0714
BIS Capital Adequacy Ratio (BIS)	299	0.9700	37.1600	11.0026	4.4139
Family Holding (FAMILY)	299	0.0000	100.0000	38.5687	42.5367
Board Size (BSIZE)	299	7	21	12.7900	3.6820
Percentage of Independent Directors (INDIR)	299	0.0000	44.4444	3.4642	8.4892
Duality of Chairman and CEO (DUAL)	299	0.0000	55.5600	16.3158	12.1224
Holding Rate of Directors and Supervisors (BSHARE)	299	0.0000	100.0000	63.0044	40.0445
Directors and Supervisors Pledge Ratio (PLEDGE)	299	0.0000	97.4500	4.8472	14.5515
Company Size (Ln(TA))	299	18.7914	21.6077	20.1851	0.8382
Debt Ratio (DEBT)	299	32.8306	99.1712	91.9430	10.6013
Return on Assets (ROA)	299	-446.0000	271.0000	-6.8328	66.1374
GDP Growth Rate (GDP)	299	3.8400	7.5500	5.7438	1.1420
Inflationary Rate (INF)	299	-1.2300	4.9700	1.9738	1.6838
After the financial crisis (2008/09/30-2010/09/30)					
Non-Performing Loans Ratio (NPL)	207	0.2900	3.5800	1.2424	0.6312
Credit Risk (CR)	207	45.7261	78.6624	61.2241	6.2459
BIS Capital Adequacy Ratio (BIS)	207	8.2300	33.0600	11.9214	3.6827
Family Holding (FAMILY)	207	0.0000	100.0000	34.8486	42.2122
Board Size (BSIZE)	207	6	19	12.3100	3.3170
Percentage of Independent Directors (INDIR)	207	0.0000	44.4444	16.7052	11.6040
Duality of Chairman and CEO (DUAL)	207	0.0000	33.3300	12.3547	8.9858
Holding Rate of Directors and Supervisors (BSHARE)	207	0.0000	100.0000	65.2815	38.1750
Directors and Supervisors Pledge Ratio (PLEDGE)	207	0.0000	100.0000	10.8122	26.7536
Company Size (Ln(TA))	207	18.7022	21.6717	20.2556	0.9196
Debt Ratio (DEBT)	207	44.5223	96.6035	92.0438	9.5602
Return on Assets (ROA)	207	-261.0000	141.0000	-1.6232	41.2959
GDP Growth Rate (GDP)	207	-8.5600	13.5900	2.1922	8.6713
Inflationary Rate (INF)	207	-1.9800	3.1000	0.4278	1.3956

Table 4.2 Descriptive statistics of Taiwan's insurance industry

All period (2005/06/30-2010/09/30)					
	N	Minimum	Maximum	Mean	Std.
Total Risk (σ)	154	1.9188	71.2462	16.5990	12.7705
Systematic Risk (Beta)	154	-0.9045	1.9966	0.8827	0.4051
Family Holding (FAMILY)	154	0.0000	66.6800	30.7977	20.1421
Board Size (BSIZE)	154	3	15	8.4400	2.7680
Percentage of Independent Directors (INDIR)	154	0.0000	28.5714	11.6507	11.9061
Duality of Chairman and CEO (DUAL)	154	0.0000	60.0000	21.5347	16.4384
Holding Rate of Directors and Supervisors (BSHARE)	154	1.3900	67.9900	29.4251	19.0669
Directors and Supervisors Pledge Ratio (PLEDGE)	154	0.0000	99.3800	22.1426	26.6618
Company Size (Ln(TA))	154	15.9449	20.2459	17.3578	1.3523
Debt Ratio (DEBT)	154	54.0058	98.6233	79.8664	12.5829
Return on Assets (ROA)	154	-2959.0000	679.0000	25.0455	269.3345
GDP Growth Rate (GDP)	154	-8.5600	13.5900	4.2909	5.8868
Inflationary Rate (INF)	154	-1.9800	4.9700	1.3414	1.7494
Before the financial crisis (2005/06/30-2008/06/30)					
Total Risk (σ)	91	1.9188	27.8244	11.5112	6.5886
Systematic Risk (Beta)	91	-.9045	1.9966	0.8211	0.4137
Family Holding (FAMILY)	91	0.0000	66.6800	30.4859	20.3773
Board Size (BSIZE)	91	3	15	7.9800	2.9510
Percentage of Independent Directors (INDIR)	91	0.0000	28.5714	3.8025	7.9923
Duality of Chairman and CEO (DUAL)	91	0.0000	60.0000	23.0296	16.3682
Holding Rate of Directors and Supervisors (BSHARE)	91	1.3900	67.9700	27.7825	18.9008
Directors and Supervisors Pledge Ratio (PLEDGE)	91	0.0000	90.3200	21.9744	28.8004
Company Size (Ln(TA))	91	15.9449	19.5508	17.2559	1.2868
Debt Ratio (DEBT)	91	54.0058	97.8899	78.4740	13.2704
Return on Assets (ROA)	91	-2959.0000	324.0000	11.6923	334.9960
GDP Growth Rate (GDP)	91	3.8400	7.5500	5.7438	1.1464
Inflationary Rate (INF)	91	-1.2300	4.9700	1.9738	1.6903
After the financial crisis (2008/09/30-2010/09/30)					
Total Risk (σ)	63	2.1508	71.2462	23.9479	15.7025
Systematic Risk (Beta)	63	0.1988	1.7479	0.9716	0.3779
Family Holding (FAMILY)	63	0.0000	66.6800	31.2479	19.9516
Board Size (BSIZE)	63	7	15	9.1100	2.3430
Percentage of Independent Directors (INDIR)	63	0.0000	28.5714	22.9869	6.0087
Duality of Chairman and CEO (DUAL)	63	0.0000	57.1400	19.3756	16.4287
Holding Rate of Directors and Supervisors (BSHARE)	63	6.9100	67.9900	31.7978	19.2064
Directors and Supervisors Pledge Ratio (PLEDGE)	63	0.0000	99.3800	22.3856	23.4528
Company Size (Ln(TA))	63	16.2436	20.2459	17.5049	1.4394
Debt Ratio (DEBT)	63	64.5174	98.6233	81.8776	11.3192
Return on Assets (ROA)	63	-270.0000	679.0000	44.3333	124.3765
GDP Growth Rate (GDP)	63	-8.5600	13.5900	2.1922	8.7198
Inflationary Rate (INF)	63	-1.9800	3.1000	0.42778	1.4034

Table 4.3 Descriptive statistics of Taiwan's securities industry

All period(2005/06/30-2010/09/30)					
	N	Minimum	Maximum	Mean	Std.
Total Risk (σ)	242	1.7553	79.4008	21.4833	14.3814
Systematic Risk (Beta)	242	-0.1795	2.0268	1.1705	0.3959
Family Holding (FAMILY)	222	0.0000	81.7900	22.2371	25.7591
Board Size (BSIZE)	242	4	20	9.7900	4.0790
Percentage of Independent Directors (INDIR)	242	0.0000	40.0000	15.6880	13.9236
Duality of Chairman and CEO (DUAL)	242	0.0000	75.0000	11.9178	14.8469
Holding Rate of Directors and Supervisors (BSHARE)	242	3.9500	54.7400	20.9333	16.4581
Directors and Supervisors Pledge Ratio (PLEDGE)	242	0.0000	95.2000	20.4116	25.6554
Company Size (Ln(TA))	242	15.3869	18.7359	17.0375	0.9501
Debt Ratio (DEBT)	242	29.5578	79.1775	60.5725	9.5721
Return on Assets (ROA)	242	-892.0000	436.0000	45.3760	135.4103
GDP Growth Rate (GDP)	242	-8.5600	13.5900	4.2909	5.8798
Inflationary Rate (INF)	242	-1.9800	4.9700	1.3414	1.7473
Before the financial crisis (2005/06/30-2008/06/30)					
Total Risk (σ)	143	1.7553	79.4008	18.7325	16.2800
Systematic Risk (Beta)	143	-0.1795	2.0268	1.0839	0.4332
Family Holding (FAMILY)	143	0.0000	80.7900	23.6880	25.6445
Board Size (BSIZE)	143	4	18	9.4500	4.00600
Percentage of Independent Directors (INDIR)	143	0.0000	40.0000	10.7907	13.9722
Duality of Chairman and CEO (DUAL)	143	0.0000	75.0000	14.3470	16.9117
Holding Rate of Directors and Supervisors (BSHARE)	143	3.9500	54.7400	20.4555	16.3869
Directors and Supervisors Pledge Ratio (PLEDGE)	143	0.0000	95.2000	19.7934	26.2047
Company Size (Ln(TA))	143	15.5141	18.3708	17.1179	0.9552
Debt Ratio (DEBT)	143	29.5578	79.1775	64.5414	8.4358
Return on Assets (ROA)	143	-311.0000	436.0000	53.6783	111.1969
GDP Growth Rate (GDP)	143	3.8400	7.5500	5.7438	1.1441
Inflationary Rate (INF)	143	-1.2300	4.9700	1.9738	1.6869
After the financial crisis (2008/09/30-2010/09/30)					
Total Risk (σ)	99	9.0169	54.5728	25.4566	9.8553
Systematic Risk (Beta)	99	0.1749	1.9123	1.2955	0.2947
Family Holding (FAMILY)	92	0.0000	81.7900	20.1871	25.9213
Board Size (BSIZE)	99	4	20	10.2900	4.1510
Percentage of Independent Directors (INDIR)	99	0.0000	40.0000	22.7619	10.4084
Duality of Chairman and CEO (DUAL)	99	0.0000	28.5700	8.4091	10.3257
Holding Rate of Directors and Supervisors (BSHARE)	99	4.1500	51.7700	21.6236	16.6195
Directors and Supervisors Pledge Ratio (PLEDGE)	99	0.0000	71.6600	21.3045	24.9454
Company Size (Ln(TA))	99	15.3869	18.7359	16.9213	0.9354
Debt Ratio (DEBT)	99	32.9672	73.6660	54.8396	8.1256
Return on Assets (ROA)	99	-892.0000	427.0000	33.3838	164.1017
GDP Growth Rate (GDP)	99	-8.5600	13.5900	2.1922	8.6944
Inflationary Rate (INF)	99	-1.9800	3.1000	0.4278	1.3993

Table 4.4 Pearson correlation coefficient of Taiwan's banking industry

	NPL	CR	BIS	FAMILY	BSIZE	INDIR	DUAL	BSHARE	PLEDGE	Ln(TA)	DEBT	ROA	GDP	INF
NPL	1													
CR	.128***	1												
BIS	-.165***	-.266***	1											
FAMILY	-.120***	-.190***	-.134***	1										
BSIZE	-0.081*	-.315***	.308***	-.494***	1									
INDIR	-.195***	-0.001	.105**	.158***	-.194***	1								
DUAL	.107**	.114**	-.140***	.440***	-.244***	-0.034	1							
BSHARE	-.378***	-0.085*	.222***	.418***	0.049	.096**	.198***	1						
PLEDGE	0.035	.130***	0.01	-.121***	-0.018	.260***	-.104**	-.243***	1					
Ln(TA)	-.355***	-.211***	-.135***	.115***	.223***	-.163***	-0.072	.459***	-.284***	1				
DEBT	0.052	.211***	-.489***	.175***	-.294***	-0.022	.116***	-.186***	0.032	.247***	1			
ROA	-.283***	-.296***	.329***	-0.058	.237***	-.167***	-.126***	.218***	-.142***	.202***	-.310***	1		
GDP	-.102**	0.001	0.023	0.005	0.037	-.096**	0.013	0.002	0.018	0.006	-0.004	.091**	1	
INF	.118***	.192***	-0.046	0.021	0.031	-.109**	0.047	-0.006	-0.026	-0.02	-0.005	-0.028	.279***	1

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.5 Pearson correlation coefficient of Taiwan's insurance industry

	σ	Beta	FAMILY	BSIZE	INDIR	DUAL	BSHARE	PLEDGE	Ln(TA)	DEBT	ROA	GDP	INF
σ	1												
Beta	.331***	1											
FAMILY	0.095	-0.112	1										
BSIZE	0.004	-0.001	0.034	1									
INDIR	.411***	.176**	-0.026	0.09	1								
DUAL	0.136*	.384***	-0.065	-.473***	-0.074	1							
BSHARE	0.002	-.172**	.370***	0.064	0.014	-.335***	1						
PLEDGE	.239***	.306***	.160**	-.297***	-0.094	.629***	-.505***	1					
Ln(TA)	.182**	.424***	0.044	-.307***	0.047	.693***	.253***	.309***	1				
DEBT	.383***	.291***	.408***	-.246***	0.097	.632***	0.143*	.437***	.787***	1			
ROA	-0.092	-0.057	-.263***	.204**	0.041	-0.095	0.099	-.306***	0.018	-.273***	1		
GDP	-.386***	0.032	-0.019	-0.047	-.179**	0.011	-0.029	-0.045	0.012	-0.128	0.084	1	
INF	-.323***	-0.107	-0.031	-0.046	-.229***	0.031	-0.021	-0.093	-0.026	-0.004	-0.024	.279***	1

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.6 Pearson correlation coefficient of Taiwan's securities industry

	σ	Beta	FAMILY	BSIZE	INDIR	DUAL	BSHARE	PLEDGE	Ln(TA)	DEBT	ROA	GDP	INF
σ	1												
Beta	.443***	1											
FAMILY	-0.038	-.379***	1										
BSIZE	-0.037	-.245***	-.548***	1									
INDIR	.185***	-0.107*	.665***	-.320***	1								
DUAL	-.137**	0.034	-.253***	-.305***	-.300***	1							
BSHARE	.170***	-.225***	.526***	-.397***	.365***	-.427***	1						
PLEDGE	-0.049	.246***	-.410***	-.151**	-.231***	.690***	-.568***	1					
Ln(TA)	-.220***	.208***	-.459***	.280***	-.458***	0.121*	-.495***	.334***	1				
DEBT	-.169***	-0.045	-.310***	0.109*	-.440***	-0.084	0.028	-0.028	.483***	1			
ROA	-.224***	-0.071	0.086	0.015	0.049	0.005	-0.003	0.003	0.056	0.047	1		
GDP	-.184***	-.187***	0.022	-0.004	-0.013	0.068	-0.024	0.015	0.09	.228***	.153**	1	
INF	.313***	0.118*	0.006	-0.052	-.166***	0.059	-0.004	-0.037	0.044	.155**	-.329***	.279***	1

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.7 Effect of family holding to the risk-taking in Taiwan banking industry

$$NPL_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * NPL_{i,t-1} + \varepsilon_{i,t} \qquad (3.1)$$

$$CR_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * CR_{i,t-1} + \varepsilon_{i,t} \qquad (3.2)$$

$$BIS_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * BIS_{i,t-1} + \varepsilon_{i,t} \qquad (3.3)$$

	Non-Performing Loans Ratio (NPL)		Credit Risk (CR)		BIS Capital Adequacy Ratio (BIS)	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	8.097	.000***	94.958	.000***	36.399	.000***
Family Holding (FAMILY)	-.003	.000***	-.033	.000***	-.002	.227
Company Size (Ln(TA))	-.347	.000***	-2.277	.000***	.367	.000***
Debt Ratio (DEBT)	.009	.018**	.159	.000***	-.360	.000***
Return on Assets (ROA)	-.003	.000***	-.024	.000***	.002	.176
GDP Growth Rate (GDP)	-.028	.000***	-.109	.072*	.036	.008***
Inflationary Rate (INF)	.040	.063*	.609	.004***	-.002	.973
Dummy*Non-Performing Loans Ratio (D*NPL)	-.235	.000***				
Dummy *Credit Risk (D*CR)			-.048	.000***		
Dummy *BIS Capital Adequacy Ratio (D*BIS)					.102	.000***
R-squared	.244		.233		.834	
Adj-R-square	.234		.223		.832	
F-statistic	23.018		21.648		358.096	
Prob(F-statistic)	.000***		.000***		.000***	
N of items	506		506		506	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.8 Effect of the family holding to risk-taking in Taiwan's insurance industry

$$\sigma_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * \sigma_{i,t-1} + \varepsilon_{i,t} \tag{3.4}$$

$$Beta_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * Beta_{i,t-1} + \varepsilon_{i,t} \tag{3.5}$$

	Total Risk (σ)		Systematic Risk (Beta)	
	coefficients	Sig.	coefficients	Sig.
Constant	22.390	.036**	-1.189	.011**
Family Holding (FAMILY)	-.102	.015**	-.003	.170
Company Size (Ln(TA))	-2.794	.007***	.135	.002***
Debt Ratio (DEBT)	.536	.000***	-.003	.532
Return on Assets (ROA)	.001	.709	.000	.074*
GDP Growth Rate (GDP)	-.350	.004***	.004	.490
Inflationary Rate (INF)	-.177	.687	-.005	.794
Dummy*Total Risk (D*σ)	.487	.000***		
Dummy*Systematic Risk (D*Beta)			.193	.002***
R-squared	.620		.273	
Adj-R-square	.601		.238	
F-statistic	33.980		7.834	
Prob(F-statistic)	.000***		.000***	
N of items	154		154	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.9 Effect of family holding to risk-taking in Taiwan securities industry

$$\sigma_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * \sigma_{i,t-1} + \varepsilon_{i,t} \qquad (3.4)$$

$$Beta_{i,t} = \alpha_0 + \alpha_1 FAMILY_{i,t} + \alpha_2 Ln(TA)_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 GDP_{i,t} + \alpha_6 INF_{i,t} + \alpha_7 D * Beta_{i,t-1} + \varepsilon_{i,t} \qquad (3.5)$$

	Total Risk (σ)		Systematic Risk (Beta)	
	coefficients	Sig.	coefficients	Sig.
Constant	67.916	.000***	.207	.658
Family Holding (FAMILY)	-.061	.101	-.004	.000***
Company Size (Ln(TA))	-3.277	.002***	.051	.076*
Debt Ratio (DEBT)	.058	.588	.000	.984
Return on Assets (ROA)	.004	.533	.000	.040**
GDP Growth Rate (GDP)	-.378	.017**	-.012	.005***
Inflationary Rate (INF)	4.054	.000***	.083	.000***
Dummy*Total Risk (D*σ)	.310	.000***		
Dummy*Systematic Risk (D*Beta)			.229	.000***
R-squared	.323		.321	
Adj-R-square	.301		.299	
F-statistic	14.563		14.479	
Prob(F-statistic)	.000***		.000***	
N of items	242		242	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.10 Effect of board effectiveness to non-performing loan ratio in Taiwan's banking industry

$$NPL_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * NPL_{i,t-1} + \varepsilon_{i,t}$$

(3.6)

Dependent Variable: Non-Performing Loans Ratio (NPL)	Model 1		Model 2		Model 3		Model 4		Model 5	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	8.294	.000***	8.741	.000***	8.643	.000***	6.912	.000***	7.093	.000***
Board Size (BSIZE)	.016	.144	.006	.566	.008	.452	.002	.867	.003	.781
Percentage of Independent Directors (INDIR)			-.021	.000***	-.021	.000***	-.016	.000***	-.015	.000***
Duality of Chairman and CEO (DUAL)					.003	.356	.007	.025**	.007	.031**
Holding Rate of Directors and Supervisors (BSHARE)							-.005	.000***	-.005	.000***
Directors and Supervisors Pledge Ratio (PLEDGE)									-.002	.272
Company Size (Ln(TA))	-.373	.000***	-.377	.000***	-.375	.000***	-.241	.000***	-.251	.000***
Debt Ratio (DEBT)	.009	.025**	.007	.083*	.007	.089*	-.001	.887	.000	.965
Return on Assets (ROA)	-.003	.000***	-.003	.000***	-.003	.000***	-.003	.000***	-.003	.000***
GDP Growth Rate (GDP)	-.027	.000***	-.021	.001***	-.021	.001***	-.023	.000***	-.022	.000***
Inflationary Rate (INF)	.042	.050*	.053	.012**	.053	.011**	.050	.015**	.049	.016**
Dummy*Non-Performing Loans Ratio (D*NPL)	-.196	.000***	-.019	.738	-.010	.868	-.055	.353	-.055	.351
R-squared	.228		.282		.284		.312		.313	
Adj-R-square	.217		.271		.271		.298		.298	
F-statistic	20.997		24.447		21.819		22.413		20.494	
Prob(F-statistic)	.000***		.000***		.000***		.000***		.000***	
N of items	506		506		506		506		506	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.11 Effect of board effectiveness to credit risk in Taiwan's banking industry

$$CR_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * CR_{i,t-1} + \varepsilon_{i,t}$$

(3.7)

Dependent Variable: Credit Risk (CR)	Model 1		Model 2		Model 3		Model 4		Model 5	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	91.433	.000***	90.055	.000***	90.678	.000***	99.607	.000***	95.068	.000***
Board Size (BSIZE)	-.515	.000***	-.502	.000***	-.520	.000***	-.489	.000***	-.519	.000***
Percentage of Independent Directors (INDIR)			.034	.348	.035	.330	.016	.675	-.001	.980
Duality of Chairman and CEO (DUAL)					-.026	.409	-.048	.144	-.042	.198
Holding Rate of Directors and Supervisors (BSHARE)							-.024	.029**	-.027	.015**
Directors and Supervisors Pledge Ratio (PLEDGE)									.046	.008***
Company Size (Ln(TA))	-1.525	.000***	-1.483	.001***	-1.486	.001***	-2.162	.000***	-1.892	.000***
Debt Ratio (DEBT)	.118	.002***	.122	.001***	.123	.001***	.158	.000***	.148	.000***
Return on Assets (ROA)	-.022	.001***	-.021	.001***	-.021	.001***	-.023	.001***	-.022	.001***
GDP Growth Rate (GDP)	-.111	.065*	-.118	.051*	-.120	.047**	-.118	.052*	-.128	.033**
Inflationary Rate (INF)	.620	.003***	.589	.006***	.582	.006***	.590	.005***	.586	.005***
Dummy*Credit Risk (D*CR)	-.054	.000***	-.063	.000***	-.065	.000***	-.062	.000***	-.065	.000***
R-squared	.245		.247		.248		.255		.266	
Adj-R-square	.235		.235		.234		.240		.249	
F-statistic	23.131		20.345		18.148		16.939		16.243	
Prob(F-statistic)	.000***		.000***		.000***		.000***		.000***	
N of items	506		506		506		506		506	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.12 Effect of board effectiveness to capital adequacy ratio in Taiwan's banking industry

$$BIS_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * BIS_{i,t-1} + \varepsilon_{i,t} \quad (3.8)$$

Dependent Variable: BIS Capital Adequacy Ratio (BIS)	Model 1		Model 2		Model 3		Model 4		Model 5	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	36.177	.000***	35.659	.000***	35.648	.000***	36.028	.000***	35.213	.000***
Board Size (BSIZE)	.039	.101	.045	.058*	.046	.063*	.047	.058*	.042	.094*
Percentage of Independent Directors (INDIR)			.016	.042**	.016	.042**	.016	.063*	.012	.154
Duality of Chairman and CEO (DUAL)					.000	.958	-.001	.937	.001	.935
Holding Rate of Directors and Supervisors (BSHARE)							.001	.685	.002	.541
Directors and Supervisors Pledge Ratio (PLEDGE)									-.019	.034**
Company Size (Ln(TA))	.329	.001***	.352	.000***	.352	.000***	.323	.009***	.372	.003***
Debt Ratio (DEBT)	-.354	.000***	-.355	.000***	-.355	.000***	-.353	.000***	-.355	.000***
Return on Assets (ROA)	.002	.227	.002	.130	.002	.130	.002	.141	.002	.121
GDP Growth Rate (GDP)	.036	.008***	.035	.009***	.035	.010**	.035	.010**	.034	.013**
Inflationary Rate (INF)	-.001	.983	-.016	.749	-.016	.750	-.015	.757	-.015	.766
Dummy*BIS Capital Adequacy Ratio (D*BIS)	.103	.000***	.084	.000***	.084	.000***	.085	.000***	.084	.000***
R-squared	.835		.836		.836		.836		.838	
Adj-R-square	.832		.833		.833		.833		.834	
F-statistic	359.156		316.767		281.006		252.497		231.574	
Prob(F-statistic)	.000***		.000***		.000***		.000***		.000***	
N of items	506		506		506		506		506	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.13 Effect of board effectiveness to total risk in Taiwan's insurance industry

$$\sigma_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * \sigma_{i,t-1} + \varepsilon_{i,t}$$

(3.9)

Dependent Variable: Total Risk (σ)	Model 1		Model 2		Model 3		Model 4		Model 5	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	15.027	.186	15.273	.179	20.440	.097*	8.731	.561	9.197	.542
Board Size (BSIZE)	-.144	.583	-.138	.600	-.024	.932	-.107	.711	-.093	.748
Percentage of Independent Directors (INDIR)			-.066	.372	-.062	.399	-.081	.280	-.066	.398
Duality of Chairman and CEO (DUAL)					.069	.275	-.025	.791	-.036	.703
Holding Rate of Directors and Supervisors (BSHARE)							-.074	.181	-.054	.376
Directors and Supervisors Pledge Ratio (PLEDGE)									.030	.458
Company Size (Ln(TA))	-1.683	.071*	-1.643	.078*	-1.965	.045**	-1.062	.369	-1.092	.357
Debt Ratio (DEBT)	.361	.001***	.353	.001***	.326	.003***	.340	.002***	.325	.003***
Return on Assets (ROA)	.001	.697	.001	.697	.001	.738	.001	.664	.002	.561
GDP Growth Rate (GDP)	-.401	.001***	-.406	.001***	-.407	.001***	-.417	.001***	-.419	.001***
Inflationary Rate (INF)	-.030	.946	.013	.976	.029	.948	.064	.885	.101	.822
Dummy*Total Risk (D*σ)	.501	.000***	.537	.000***	.544	.000***	.552	.000***	.541	.000***
R-squared	.605		.607		.610		.615		.617	
Adj-R-square	.586		.585		.586		.588		.587	
F-statistic	31.920		27.992		25.050		22.852		20.760	
Prob(F-statistic)	.000***		.000***		.000***		.000***		.000***	
N of items	154		154		154		154		154	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.14 Effect of board effectiveness to systematic risk in Taiwan's insurance industry

$$Beta_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * Beta_{i,t-1} + \varepsilon_{i,t}$$

(3.10)

Dependent Variable: Systematic Risk (Beta)	Model 1		Model 2		Model 3		Model 4		Model 5	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	-1.851	000***	-1.840	.001***	-1.045	.055*	-2.100	.002***	-2.123	.002***
Board Size (BSIZE)	-.029	.108	-.021	.116	-.042	.005***	-.032	.019**	-.029	.018**
Percentage of Independent Directors (INDIR)			.000	.940	.000	.995	.000	.996	.001	.880
Duality of Chairman and CEO (DUAL)					.010	.000***	.002	.644	.001	.724
Holding Rate of Directors and Supervisors (BSHARE)							-.006	.007***	-.006	.021**
Directors and Supervisors Pledge Ratio (PLEDGE)									.001	.642
Company Size (Ln(TA))	.182	000***	.181	.000***	.131	.002***	.209	.000***	.211	.000***
Debt Ratio (DEBT)	-.008	.058*	-.008	.059*	-.012	.007***	-.010	.016**	-.011	.015**
Return on Assets (ROA)	.000	.031**	.000	.032**	.000	.018**	.000	.028**	.000	.038**
GDP Growth Rate (GDP)	.003	.609	.003	.626	.002	.675	.002	.750	.002	.739
Inflationary Rate (INF)	-.003	.884	-.002	.895	-.001	.962	-.003	.885	-.002	.923
Dummy*Systematic Risk (D*Beta)	.179	004***	.184	.053*	.216	.019**	.177	.051*	.165	.080*
R-squared	.277		.277		.341		.374		.375	
Adj-R-square	.242		.237		.300		.330		.326	
F-statistic	7.972		8.282		8.282		8.534		7.735	
Prob(F-statistic)	.000***		.000***		.000***		.000***		.000***	
N of items	154		154		154		154		154	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.15 Effect of board effectiveness to total risk in Taiwan's securities industry

$$\sigma_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} + \beta_9 GDP_{i,t}$$
$$+ \beta_{10} INF_{i,t} + \beta_{11} D * \sigma_{i,t-1} + \varepsilon_{i,t}$$

(3.9)

Dependent Variable: Total Risk (σ)	Model 1		Model 2		Model 3		Model 4		Model 5	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	60.395	.000***	48.773	.003***	39.638	.031**	37.924	.056*	43.865	.026**
Board Size (BSIZE)	.064	.749	.157	.447	.221	.306	.261	.347	.435	.122
Percentage of Independent Directors (INDIR)			.112	.118	.095	.195	.103	.203	.098	.218
Duality of Chairman and CEO (DUAL)					.067	.288	.018	.818	-.093	.286
Holding Rate of Directors and Supervisors (BSHARE)							-.077	.308	-.156	.050*
Directors and Supervisors Pledge Ratio (PLEDGE)									.133	.007***
Company Size (Ln(TA))	-2.986	.002***	-2.542	.012**	-1.920	.099*	-1.890	.107	-2.444	.038**
Debt Ratio (DEBT)	.060	.553	.091	.375	.039	.731	.043	.707	.028	.804
Return on Assets (ROA)	.003	.656	.002	.750	.002	.778	.002	.780	.002	.755
GDP Growth Rate (GDP)	-.366	.016**	-.419	.007***	-.410	.008***	-.414	.008***	-.430	.005***
Inflationary Rate (INF)	3.919	.000***	3.991	.000***	3.977	.000***	3.984	.000***	4.094	.000***
Dummy*Total Risk (D*σ)	.334	.000***	.304	.000***	.298	.000***	.299	.000***	.269	.000***
R-squared	.325		.332		.335		.335		.356	
Adj-R-square	.305		.309		.309		.307		.326	
F-statistic	16.087		14.471		12.996		11.654		11.576	
Prob(F-statistic)	.000***		.000***		.000***		.000***		.000***	
N of items	242		242		242		242		242	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.16 Effect of board effectiveness to systematic risk in Taiwan's securities industry

$$Beta_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t}$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \beta_{11} D * Beta_{i,t-1} + \varepsilon_{i,t}$$

(3.10)

Dependent Variable: Systematic Risk (Beta)	Model 1		Model 2		Model 3		Model 4		Model 5	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	-.415	.301	.058	.900	-.030	.947	.163	.772	.276	.616
Board Size (BSIZE)	-.014	.012**	-.013	.088*	-.017	.013**	-.019	.070*	-.032	.008***
Percentage of Independent Directors (INDIR)			-.004	.042**	-.002	.360	-.002	.338	-.002	.378
Duality of Chairman and CEO (DUAL)					.004	.037**	.003	.150	-.001	.811
Holding Rate of Directors and Supervisors (BSHARE)							-.001	.551	.002	.462
Directors and Supervisors Pledge Ratio (PLEDGE)									.005	.001***
Company Size (Ln(TA))	.066	.018**	.045	.126	.033	.267	.023	.499	.011	.745
Debt Ratio (DEBT)	.002	.603	.001	.762	.003	.294	.004	.240	.003	.389
Return on Assets (ROA)	.000	.061*	.000	.035**	.000	.033**	.000	.031**	.000	.033**
GDP Growth Rate (GDP)	-.012	.003***	-.011	.010**	-.012	.004***	-.012	.004***	-.012	.003***
Inflationary Rate (INF)	.089	.000***	.090	.000***	.092	.000***	.092	.000***	.093	.000***
Dummy*Systematic Risk (D*Beta)	.266	.000***	.303	.000***	.309	.000***	.312	.000***	.272	.000***
R-squared	.294		.306		.319		.320		.352	
Adj-R-square	.273		.282		.293		.291		.321	
F-statistic	13.897		12.849		12.079		10.876		11.343	
Prob(F-statistic)	.000***		.000***		.000***		.000***		.000***	
N of items	242		242		242		242		242	

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 4.17 Comparison of the expected and the empirical results of multiple regression analysis in Taiwan's banking industry

Independent Variable	Direction of Banking Risk Expectations		
	Non-Performing Loans Ratio (NPL)	Credit Risk (CR)	BIS Capital Adequacy Ratio (BIS)
Family Holding (FAMILY)	- -***	- -***	+
Board Size (BSIZE)	-	- -***	+ +*
Percentage of Independent Directors (INDIR)	- -***	-	+
Duality of Chairman and CEO (DUAL)	+ +**	+	-
Holding Rate of Directors and Supervisors (BSHARE)	- -***	- -**	+
Directors and Supervisors Pledge Ratio (PLEDGE)	+	+ +***	- -*
Company Size (Ln(TA))	- -***	- -***	+ +***
Debt Ratio (DEBT)	+	+ +***	- -***
Return on Assets (ROA)	- -***	- -***	+
GDP Growth Rate (GDP)	- -***	- -**	+ +**
Inflationary Rate (INF)	+ +**	+ +***	-

Table 4.18 Comparison of the expected and the empirical results of multiple regression analysis in Taiwan's insurance and securities industries

Independent Variable	Direction of The Expected Risk			
	Insurance		Securities	
	Total Risk (σ)	Systematic Risk (Beta)	Total Risk (σ)	Systematic Risk (Beta)
Family Holding (FAMILY)	- -**	-	-	- -***
Board Size (BSIZE)	-	- -**	-	-
Percentage of Independent Directors (INDIR)	-	-	-	-
Duality of Chairman and CEO (DUAL)	+	+	+	+
Holding Rate of Directors and Supervisors (BSHARE)	-	- -**	- -*	-
Directors and Supervisors Pledge Ratio (PLEDGE)	+	+	+ +***	+ +***
Company Size (Ln(TA))	-	- +***	- -***	-
Debt Ratio (DEBT)	+ +***	+ -**	+	+
Return on Assets (ROA)	-	- +***	-	- +**
GDP Growth Rate (GDP)	- -***	-	- -***	- -***
Inflationary Rate (INF)	+	+	+ +***	+ +***

Table 5.1 Descriptive statistics of China's banking industry

All period(2007/12/31-2010/09/30)					
	N	Minimum	Maximum	Mean	Std.
Non-Performing Loans Ratio (NPL)	168	0.3600	5.6400	1.3922	0.7967
Credit Risk (CR)	168	0.0000	74.5616	56.0784	8.8604
BIS Capital Adequacy Ratio (BIS)	168	5.7700	30.1400	12.2880	3.6364
Board Size (BSIZE)	168	11	22	16.3300	1.7660
Percentage of Independent Directors (INDIR)	168	23.5294	42.8571	33.5605	3.9509
Duality of Chairman and CEO (DUAL)	168	6.6700	35.2900	19.4073	6.3667
Company Size (Ln(TA))	168	18.1398	23.3199	20.9668	1.3639
Debt Ratio (DEBT)	168	86.9288	97.7959	94.1812	1.9804
Return on Assets (ROA)	168	-59.0000	50.0000	27.5774	11.3978
GDP Growth Rate (GDP)	168	6.5000	14.2000	10.1167	2.0329
Inflationary Rate (INF)	168	-1.7000	8.3000	2.9000	3.1577
Before the financial crisis (2007/12/31-2008/06/30)					
Non-Performing Loans Ratio (NPL)	42	0.3600	5.6400	1.9520	1.1105
Credit Risk (CR)	42	43.4973	67.1062	55.4333	6.3621
BIS Capital Adequacy Ratio (BIS)	42	5.7700	30.1400	13.6081	5.3912
Board Size (BSIZE)	42	14	19	16.5000	1.4690
Percentage of Independent Directors (INDIR)	42	23.5294	40.0000	32.9012	4.0329
Duality of Chairman and CEO (DUAL)	42	11.1100	35.2900	20.4412	5.6345
Company Size (Ln(TA))	42	18.1398	22.9640	20.6914	1.4120
Debt Ratio (DEBT)	42	86.9288	97.7959	93.6835	2.5998
Return on Assets (ROA)	42	8.0000	50.0000	33.0000	10.2124
GDP Growth Rate (GDP)	42	11.0000	14.2000	12.1667	1.4605
Inflationary Rate (INF)	42	6.5000	8.3000	7.3000	0.7574
After the financial crisis (2008/09/30-2010/09/30)					
Non-Performing Loans Ratio (NPL)	126	0.4800	4.2700	1.2056	0.5505
Credit Risk (CR)	126	0.0000	74.5616	56.2934	9.5615
BIS Capital Adequacy Ratio (BIS)	126	8.1100	24.8550	11.8480	2.7115
Board Size (BSIZE)	126	11	22	16.2700	1.8570
Percentage of Independent Directors (INDIR)	126	23.5294	42.8571	33.7803	3.9148
Duality of Chairman and CEO (DUAL)	126	6.6700	35.2900	19.0627	6.5775
Company Size (Ln(TA))	126	18.3363	23.3199	21.0586	1.3406
Debt Ratio (DEBT)	126	87.6559	97.5857	94.3471	1.7064
Return on Assets (ROA)	126	-59.0000	46.0000	25.7698	11.2329
GDP Growth Rate (GDP)	126	6.5000	11.9000	9.4333	1.7143
Inflationary Rate (INF)	126	-1.7000	4.6000	1.4333	2.1118

Table 5.2 Descriptive statistics of China's securities industry

	N	Minimum	Maximum	Mean	Std.
All period(2007/12/31-2010/09/30)					
Total Risk (σ)	108	15.2606	317.3130	62.9129	64.8782
Systematic Risk (Beta)	108	0.3336	4.7335	1.2742	0.4044
Board Size (BSIZE)	108	7	23	11.8200	3.7980
Percentage of Independent Directors (INDIR)	108	0.0000	47.0588	33.4443	10.2013
Duality of Chairman and CEO (DUAL)	108	0.0000	33.3300	11.6539	9.1266
Company Size (Ln(TA))	108	15.0098	19.2680	16.8748	1.1173
Debt Ratio (DEBT)	108	41.9249	85.3666	66.9873	9.3633
Return on Assets (ROA)	108	-542.0000	432.0000	107.6759	143.5715
GDP Growth Rate (GDP)	108	6.5000	14.2000	10.1167	2.0363
Inflationary Rate (INF)	108	-1.7000	8.3000	2.9000	3.1630
Before the financial crisis (2007/12/31-2008/06/30)					
Total Risk (σ)	27	34.9116	317.3130	129.2917	89.1026
Systematic Risk (Beta)	27	0.3336	4.7335	1.3538	0.7333
Board Size (BSIZE)	27	8	23	11.7800	4.0790
Percentage of Independent Directors (INDIR)	27	0.0000	47.0588	24.2817	16.45971
Duality of Chairman and CEO (DUAL)	27	0.0000	33.3300	12.5526	9.6961
Company Size (Ln(TA))	27	15.1822	19.2680	16.8190	1.1911
Debt Ratio (DEBT)	27	57.5379	85.3666	69.0157	8.4216
Return on Assets (ROA)	27	-542.0000	432.0000	83.3704	238.7316
GDP Growth Rate (GDP)	27	11.0000	14.2000	12.1667	1.4705
Inflationary Rate (INF)	27	6.5000	8.3000	7.3000	0.7626
After the financial crisis (2008/09/30-2010/09/30)					
Total Risk (σ)	81	15.2606	223.3138	40.7867	32.6612
Systematic Risk (Beta)	81	0.5907	1.6518	1.2477	0.2029
Board Size (BSIZE)	81	7	19	11.8400	3.72600
Percentage of Independent Directors (INDIR)	81	30.0000	42.8571	36.4985	3.6552
Duality of Chairman and CEO (DUAL)	81	0.0000	33.3300	11.3543	8.9715
Company Size (Ln(TA))	81	15.0098	19.1846	16.8934	1.0988
Debt Ratio (DEBT)	81	41.9249	83.7024	66.3112	9.6103
Return on Assets (ROA)	81	-323.0000	284.0000	115.7778	93.7074
GDP Growth Rate (GDP)	81	6.5000	11.9000	9.4333	1.7181
Inflationary Rate (INF)	81	-1.7000	4.6000	1.4333	2.1165

Table 5.3 Pearson correlation coefficient of China's banking industry

	NPL	CR	BIS	BSIZE	INDIR	DUAL	Ln(TA)	DEBT	ROA	GDP	INF
NPL	1										
CR	-0.078	1									
BIS	-0.007	-.314***	1								
BSIZE	-.238***	0.092	-0.119	1							
INDIR	-.300***	-.192**	-0.064	0.123	1						
DUAL	-.187**	-.288***	.266***	-.225***	-0.063	1					
Ln(TA)	.222***	-0.052	-.364***	-0.024	-.188**	-.347***	1				
DEBT	0.022	0.087	-.479***	.188**	.235***	-0.117	.308***	1			
ROA	-0.041	-0.073	.367***	0.042	-0.031	0.042	-0.059	-.415***	1		
GDP	.210***	-0.049	0.118	0.078	0.006	0.021	-0.046	-0.098	.154**	1	
INF	.332***	-0.076	.184**	0.087	-0.04	0.066	-0.084	-0.141*	.319***	.576***	1

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 5.4 Pearson correlation coefficient of China's securities industry

	σ	Beta	BSIZE	INDIR	DUAL	Ln(TA)	DEBT	ROA	GDP	INF
σ	1									
Beta	0.12	1								
BSIZE	-0.104	-0.002	1							
INDIR	-.339***	-0.171*	0.022	1						
DUAL	-0.175*	-0.139	-.243**	-0.086	1					
Ln(TA)	-.255***	0.036	.592***	-0.038	-0.014	1				
DEBT	0.135	0.125	-.228**	-0.085	0.166*	-0.125	1			
ROA	-.331***	-0.181*	0.03	-0.074	.396***	0.156	0.134	1		
GDP	.307***	0.124	-0.079	-.501***	0.014	0.03	0.002	-.220**	1	
INF	.492***	0.075	-0.019	-.319***	0.022	-0.007	0.014	-.210**	.576***	1

Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 5.5 Effect of board effectiveness to non-performing loan ratio in China's banking industry

$$NPL_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} + \beta_9 GDP_{i,t}$$
$$+ \beta_{10} INF_{i,t} + \beta_{11} D * NPL_{i,t-1} + \varepsilon_{i,t}$$

(3.6)

Dependent Variable: Non-Performing Loans Ratio (NPL)	Model 1		Model 2		Model 3	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	-.225	.939	-1.298	.650	-2.057	.468
Board Size (BSIZE)	-.101	.001***	-.096	.002***	-.079	.011**
Percentage of Independent Directors (INDIR)			-.047	.001***	-.043	.002***
Duality of Chairman and CEO (DUAL)					-.052	.015**
Company Size (Ln(TA))	.107	.014**	.066	.134	.111	.018**
Debt Ratio (DEBT)	.013	.697	.047	.153	.037	.262
Return on Assets (ROA)	-.007	.246	-.004	.435	-.006	.302
GDP Growth Rate (GDP)	-.075	.095*	-.061	.164	-.060	.164
Inflationary Rate (INF)	.180	.000***	.169	.000***	.163	.000***
Dummy*Non-Performing Loans Ratio (D*NPL)	-.262	.006***	-.267	.004***	-.235	.010**
R-squared	.314		.360		.384	
Adj-R-square	.284		.328		.349	
F-statistic	10.442		11.184		10.932	
Prob(F-statistic)	.000***		.000***		.000***	
N of items	168		168		168	

Note: TEJ database doesn't have Chain's data of Holding Rate of Directors and Supervisors (BSHARE) and Directors and Supervisors Pledge Ratio (PLEDGE). Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 5.6 Effect of board effectiveness of credit risk in China's banking industry

$$CR_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} + \beta_9 GDP_{i,t}$$
$$+ \beta_{10} INF_{i,t} + \beta_{11} D * CR_{i,t-1} + \varepsilon_{i,t}$$

(3.7)

Dependent Variable: Credit Risk (CR)	Model 1		Model 2		Model 3	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	28.885	.440	14.972	.681	38.671	.264
Board Size (BSIZE)	.354	.381	.418	.285	-.022	.954
Percentage of Independent Directors (INDIR)			-.635	.001***	-.745	.000***
Duality of Chairman and CEO (DUAL)					-.521	.000***
Company Size (Ln(TA))	-.563	.293	-1.114	.041**	-2.084	.000***
Debt Ratio (DEBT)	.319	.441	.780	.066*	.980	.015**
Return on Assets (ROA)	-.016	.824	.014	.841	.028	.663
GDP Growth Rate (GDP)	-.081	.891	.106	.854	.121	.823
Inflationary Rate (INF)	.340	.506	.194	.694	.046	.922
Dummy*Credit Risk (D*CR)	.081	.067*	.081	.058*	.050	.218
R-squared	.046		.114		.224	
Adj-R-square	.004		.070		.179	
F-statistic	1.105		2.562		5.056	
Prob(F-statistic)	.000***		.000***		.000***	
N of items	168		168		168	

Note: TEJ database doesn't have Chain's data of Holding Rate of Directors and Supervisors (BSHARE) and Directors and Supervisors Pledge Ratio (PLEDGE). Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 5.7 Effect of board effectiveness to capital adequacy ratio in China's banking industry

$$BIS_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} + \beta_9 GDP_{i,t}$$
$$+ \beta_{10} INF_{i,t} + \beta_{11} D * BIS_{i,t-1} + \varepsilon_{i,t}$$

(3.8)

Dependent Variable: BIS Capital Adequacy Ratio (BIS)	Model 1		Model 2		Model 3	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	164.939	.000***	169.272	.000***	166.722	.000***
Board Size (BSIZE)	.074	.344	.060	.424	.159	.027**
Percentage of Independent Directors (INDIR)			.131	.000***	.159	.000***
Duality of Chairman and CEO (DUAL)					.113	.000***
Company Size (Ln(TA))	-.253	.016**	-.140	.182	.076	.468
Debt Ratio (DEBT)	-1.569	.000***	-1.678	.000***	-1.746	.000***
Return on Assets (ROA)	-.006	.668	-.012	.375	-.015	.223
GDP Growth Rate (GDP)	-.090	.426	-.124	.259	-.103	.309
Inflationary Rate (INF)	.114	.234	.117	.206	.052	.545
Dummy*BIS Capital Adequacy Ratio (D*BIS)	.000	.999	-.017	.631	-.047	.159
R-squared	.787		.804		.834	
Adj-R-square	.777		.794		.825	
F-statistic	84.278		81.330		88.290	
Prob(F-statistic)	.000***		.000***		.000***	
N of items	168		168		168	

Note: TEJ database doesn't have Chain's data of Holding Rate of Directors and Supervisors (BSHARE) and Directors and Supervisors Pledge Ratio (PLEDGE). Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 5.8 Effect of board effectiveness to total risk in China's securities industry

$$\sigma_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} + \beta_9 GDP_{i,t}$$
$$+ \beta_{10} INF_{i,t} + \beta_{11} D * \sigma_{i,t-1} + \varepsilon_{i,t}$$

(3.9)

Dependent Variable: Total Risk (σ)	Model 1		Model 2		Model 3	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	310.418	.005***	468.947	.000***	460.137	.000***
Board Size (BSIZE)	2.338	.237	1.585	.381	.700	.708
Percentage of Independent Directors (INDIR)			-2.494	.000***	-2.516	.000***
Duality of Chairman and CEO (DUAL)					-.948	.105
Company Size (Ln(TA))	-17.135	.012**	-14.924	.017**	-13.327	.034**
Debt Ratio (DEBT)	1.045	.065*	.842	.104	.886	.085*
Return on Assets (ROA)	-.112	.004***	-.142	.000***	-.119	.002***
GDP Growth Rate (GDP)	-7.540	.084*	-16.906	.000***	-17.171	.000***
Inflationary Rate (INF)	12.500	.000***	14.684	.000***	15.079	.000***
Dummy*Total Risk (D*σ)	-.099	.376	-.057	.581	-.053	.602
R-squared	.397		.502		.516	
Adj-R-square	.355		.462		.471	
F-statistic	9.418		12.487		11.586	
Prob(F-statistic)	.000***		.000***		.000***	
N of items	108		108		108	

Note: TEJ database doesn't have Chain's data of Holding Rate of Directors and Supervisors (BSHARE) and Directors and Supervisors Pledge Ratio (PLEDGE). Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 5.9 Effect of board effectiveness to systematic risk in China's securities industry

$$Beta_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t} + \beta_2 INDIR_{i,t} + \beta_3 DUAL_{i,t} + \beta_4 BSHARE_{i,t} + \beta_5 PLEDGE_{i,t} + \beta_6 Ln(TA)_{i,t} + \beta_7 DEBT_{i,t} + \beta_8 ROA_{i,t} + \beta_9 GDP_{i,t}$$
$$+ \beta_{10} INF_{i,t} + \beta_{11} D * Beta_{i,t-1} + \varepsilon_{i,t}$$

(3.10)

Dependent Variable: Systematic Risk (Beta)	Model 1		Model 2		Model 3	
	coefficients	Sig.	coefficients	Sig.	coefficients	Sig.
Constant	.061	.940	.597	.483	.551	.517
Board Size (BSIZE)	-.001	.929	-.003	.828	-.008	.602
Percentage of Independent Directors (INDIR)			-.010	.072*	-.010	.070*
Duality of Chairman and CEO (DUAL)					-.005	.281
Company Size (Ln(TA))	.033	.510	.036	.473	.045	.379
Debt Ratio (DEBT)	.007	.112	.007	.121	.007	.109
Return on Assets (ROA)	-.001	.052*	-.001	.027**	-.001	.098*
GDP Growth Rate (GDP)	.029	.389	-.011	.790	-.012	.768
Inflationary Rate (INF)	-.011	.682	.016	.613	.017	.577
Dummy*Systematic Risk (D*Beta)	-.001	.993	.121	.351	.118	.361
R-squared	.072		.102		.113	
Adj-R-square	.007		.029		.031	
F-statistic	1.109		1.406		1.383	
Prob(F-statistic)	.000***		.000***		.000***	
N of items	108		108		108	

Note: TEJ database doesn't have Chain's data of Holding Rate of Directors and Supervisors (BSHARE) and Directors and Supervisors Pledge Ratio (PLEDGE). Notes: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.

Table 5.10 Comparison of the expected and the empirical results of multiple regression analysis in Chain's banking and securities industries

Independent Variable	Direction of The Expected Risk				
	Bank			Securities	
	Non-Performing Loans Ratio (NPL)	Credit Risk (CR)	BIS Capital Adequacy Ratio (BIS)	Total Risk (σ)	Systematic Risk (Beta)
Board Size (BSIZE)	- -**	-	+ +**	-	-
Percentage of Independent Directors (INDIR)	- -***	- -***	+ +***	- -***	- -*
Duality of Chairman and CEO (DUAL)	+ -**	+ -***	- +***	+	+
Company Size (Ln(TA))	- +**	- -***	+	- -**	-
Debt Ratio (DEBT)	+	+ +**	- -***	+ +*	+
Return on Assets (ROA)	-	-	+	- -***	- -*
GDP Growth Rate (GDP)	-	-	+	- -***	-
Inflationary Rate (INF)	+ +***	+	-	+ +***	+