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碩 士 論 文

新興市場內部公司治理機制之
替代效果與互補效果分析

An Analysis of the Substitution and Complement Effects of

Internal Corporate Governance Mechanisms:

Evidence from an Emerging Country

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中文摘要

　　自2002年以降，獨立董監制度已在台灣部分實施五年。自2007開始，獨立董監制度將在台灣上市公司全面實施。年本論文從過去五年來獨立董監制度與其他內部公司治理機制間之交互關係審視其效力及效率。研究結果有三：第一，董事會獨立性、本國法人持股、與外資法人持股皆與公司之價值有正向關係。第二，獨立董監與本國法人持股之監督效果為替代關係、而獨立董監與外資法人持股之監督效果為互補關係，且雙重完善公司治理機制之價值效果大於單一完善公司治理機制之價值效果。第三，公司治理機制間之交互關係與公司特性相關，其中互補作用在規模較小之公司或舉債較少之公司較為顯著，而替代關係在規模較大之公司或舉債較多之公司較為顯著。本論文之啟示為，多重公司治理未必對所有公司皆為最適安排，對於公司治理機制之間替代作用較為顯著之公司而言，可能適合集中資源強化單一公司治理機制，避免造成多項公司治理機制之效力重複而成本浪費；而對於公司治理機制之間互補作用較為顯著之公司而言，可能適合分散資源於多重公司治理使其達到互補效果。

關鍵詞

公司治理、台灣、獨立董監、交互作用

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ABSTRACT

Independent director has been partially enforced in Taiwan for 5 years and is about to instituted thoroughly. This thesis examines the effectiveness and efficiency of independent director in Taiwanese corporate governance system by investigating how it interacts with other internal governance mechanisms, including domestic institutional investor and foreign institutional investor. The result acknowledges the positive valuation effect of independent director, as well as domestic institutional investor and foreign institutional investor, and finds that the governance effect of independent director substitutes the effect of domestic institutional investor and complements the effect of foreign institutional investor. Moreover, the interactions between internal governance mechanisms depend on firm characteristics. The substitution effect exists in large or high-leveraged firms while the complementary effect exists in small or low-leveraged firms. The implication of this research is that multiple governance mechanism is not necessarily optimal for every firm. For some firms it might be better to concentrate their resources in refining a single governance mechanism, while for others, it is more beneficial to diversify into many governance mechanisms with complementary effects.

KEYWORDS

Corporate governance, Taiwan, Independent director, Interaction.

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1. INTRODUCTION

Corporate governance are defined as a set of mechanisms–both internal and external-that induces the self-interested controllers of a company to make decisions that maximize the value of the company to its owners (Denis and McConnell 2003). The internal governance mechanisms of primary interest are the board of directors and the equity ownership structure of the firm (Denis and McConnell 2003). Among the board, independent directors are in a better position to monitor managerial behavior as they would not scruple to contradict the management (Choi *et al.* 2007). Regarding the equity ownership, large shareholders have the incentive to monitor management to make decisions that maximize the welfare of all shareholders (Shleifer and Vishny 1986 cited in Cremers and Nair 2005). As such, an appropriate corporate governance mechanism design is suppose to enhance firm valuation. However, each governance mechanism may not work independently to affect firm valuation (Danielson and Karpoff 1998). The aim of this thesis is trying to provide a better understanding of how these internal governance mechanisms interact. The thesis proceeds via four questions: Which governance mechanisms are value-enhancing? How do independent director and blockholder interact to affect firm valuation? How does this interaction depend on firm characteristics? And what implementation does it have for the corporate governance mechanism design?

Theoretical viewpoints regarding how governance mechanisms interact with each other are dichotomized. On the one hand, Shleifer and Vishny (1986 cited in Cremers and Nair 2005) suggest that different mechanisms might be complements and substantially facilitate each other. On the other hand, Pound (1992 cited in Cremers and Nair 2005) proposes that different mechanisms can be viewed as substitutes if their effects overlap each other. Accordingly, firms with both

mechanisms obtain similar governance outcome to those with only one mechanism.

Independent director and blockholder both have some trait that the other party is short of and thus may function as complements. On the one hand, the more abundant wealth incentive of blockholder complements the shortcoming of independent director for mitigating shareholders' collective action problem (Becht *et al.* 2003 p.18); on the other hand, the neutrality of independent director complements the tendency of blockholder to collude with management when the entrenchment effect exceeds the alignment effect (Morck *et al.* 1988 and McConnell and Servaes 1990 cited in Denis and McConnell 2003 p.10). However, independent director and blockholder also have some similar trait that may function as substitutes. Fama and Jensen (1983) points out that independent director is induced by the "reputation incentive" to monitor the management in order to develop the expert prestige. Yermack (2004) corroborates this argument by an empirical research, finding that independent director receives positive performance incentives of compensation, turnover, and opportunities to obtain new board seats. The reputation incentive of independent director might play a substitute role for the wealth incentive of blockholder in the governance outcome.

This thesis tries to clarify whether the substitution effect or the complementary effect outweighs the other between independent director and blockholder. Independent director has been obligate to newly-public firms in Taiwan since 2002. Other public-listed firms can choose to set it or not during the buffer period. Starting from 2007, independent director is instituted thoroughly; all public listed firms that exceed a certain capital amount have to set at least two seats of independent director and at least 20 percent of the board comprising of independent directors (United Group Daily News 2005). Since during the past 5 year, independent director was optional for firms, this thesis conducts a retrospective research, investigating whether this

legitimated standard of board independence had a positive valuation effect on firms adopt it.

The importance of the interaction between governance mechanisms lies in the construction of a cost-efficient governance mechanism design. Each corporate governance mechanism that initiated to monitor management discretion and mitigate agency costs actually has its opportunity cost[1]. To avoid either paying multiple costs yet receiving overlapping effects, or receiving inefficient effect due to lack of complementary mechanisms, it is crucial to understand how governance mechanisms interact with each other, so that it is feasible to construct a cost-efficient governance mechanism design.

Recently the research is increasingly interested in the effect of multiple governance mechanisms (Gillan 2005). Some analyses have attempted to study this issue by principle analysis yet find it difficult to interpret. Other researches alternatively choose to study this issue means of the substitution or complementary effect analysis. Shleifer and Vishny (1986 cited in Cremers and Nair 2005) take blockholder and anti-takeover provision as example, arguing that the latter in some cases can not perform successfully without the existence of the former. Following Shleifer and Vishny (1986), Cremers and Nair (2005) further prove that not only anti-takeover provisions but also blockholder can not function efficiently alone. So far

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[1] For instance, firstly, independent directors are paid good salaries. Basing on Taiwan Economic Journal Great China Database (TEJ), on average each firm paid 1.8 percent of its pre-tax income to directors in 2006, and the average salary of each director is 2.33 million. Secondly, blockholder, via its tremendous influence, intervenes in management decision and sacrifices firm autonomy (Aghion and Tirole 1997, Burtkart *et al.* 1997 and Paganoand and Roell 1998 cited in Becht *et al.* 2003 p.26). Thirdly, diminishing the anti-takeover provisions exposes the company to the highly disruptive and costly takeover market, and induces management to seek after short-term profit (Gompers *et al.* 2003 and Becht *et al.* 2003 p.19). Fourthly, minimizing the control rights in excess of cash flow rights, a mechanism more prevailing in non-US market (Denis and McConnell 2003 p.19), forces insiders to plunge more money into shareholding and thus subjects insiders to high level of idiosyncratic risk, which in turn, increases the risk premium, and subsequently, the marginal cost of capital (Giannetti 2003 cited in Denis and McConnell 2003 p.22).

western literatures mostly deal with the interaction of anti-takeover provisions and other governance mechanisms (for example, Shleifer and Vishny 1986 and Cremers and Nair 2005 compare it with blockholder, while Danielson and Karpoff 1998 compare it with independent director). To the best of my knowledge, there has not been any paper discussing the interaction of governance mechanisms in the emerging market such as Taiwan. As takeover activities are only active in US and UK markets and very rare in most of emerging markets (Becht *et al.* 2003), this thesis examines the substitution and complementary effects of the internal corporate governance mechanism in association with firm valuation in Taiwan following Cremers and Nair's (2005) methodology.

In order to make up for the shortage of not discussing the takeover mechanism, this thesis discusses an alternative equity ownership structure issue that is especially prominent in emerging markets: the shareholding leverage. Deviation of control rights away from cash flow rights is one form of the "shareholding leverage" concept and is especially prevailing in emerging countries (Denis and McConnell 2003 p.19). A similar and more specific form of shareholding leverage in Taiwan is the pledge ratio, defined as the percentage of the shareholding of controlling shareholder pledged for bank loans (Lee and Yeh 2004). Both forms of shareholding leverage enable the incumbents to leverage small amount of own capital to hold large stake of firm control, which offers them the ability and incentive to gain private benefits and expropriate from minority shareholders (Claessens *et al.* 2000). This thesis also examines the valuation effect of these negative governance mechanisms.

The findings of this thesis are easily summarized as follows. Independent director, as well as domestic blockholder and foreign blockholder have significant positive valuation effects, while both forms of shareholding leverage show

insignificant effects. Moreover, independent director show substitution effect to domestic blockholder and complementary effect to foreign blockholder. These interactions depend on firm characteristics. Substitution effect exists in large or high-leveraged firms and complementary effect exists in small or low-leveraged firms.

The remainder of this thesis is presented in the following sequence. Section 2 illustrates the theoretical background. Section 3 reviews the literatures. Section 4 introduces the data. Section 5 elaborates the methodology. Section 6 interprets the results, and section 7 draws the conclusions.
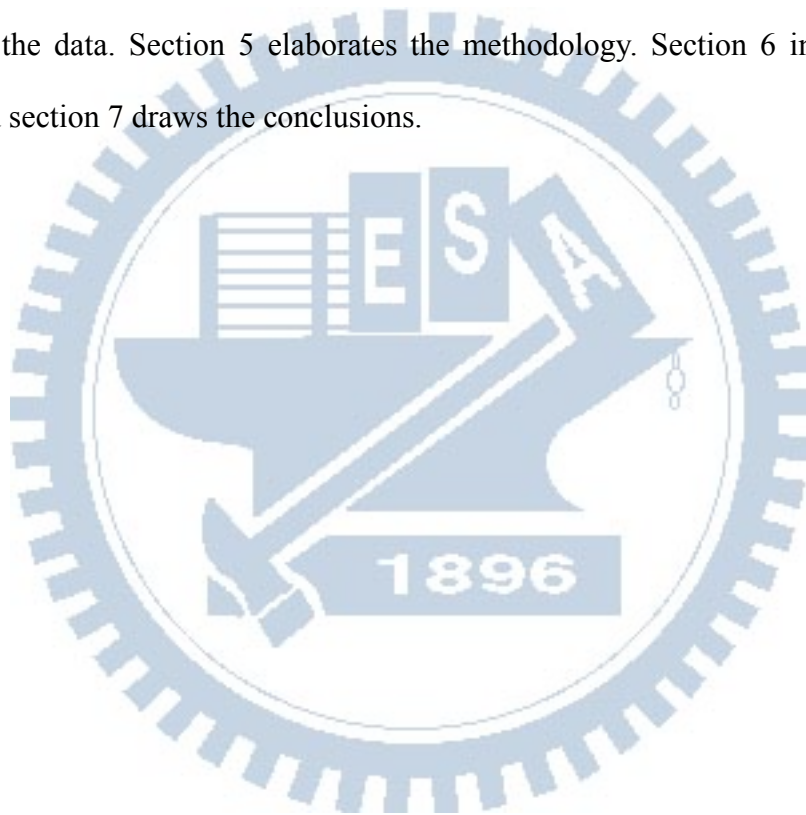
2. THEORETICAL BACKGROUND

The main objective of this paper is to distinguish whether different governance mechanisms are substitute goods or complementary goods. This section applies the economic theory of substitute and complement to illustrate how firm valuation reflects governance mechanism interaction. Comparing the capital market to a commodity market, different governance mechanisms can be viewed as related goods and equity can be viewed as a bundle package containing different governance mechanisms. In this market, shareholders are the demand side and the managers are the supply side. If shareholders perceive better protection under a certain bundle of corporate governance mechanisms, they are willing to give premium value to that bundle.

Analogically, if a firm consists of two governance mechanisms which substitute each other, for a rational consumer, buying these two mechanisms with overlapping functions will not bring higher utilities than buying only either of them, so she is unwilling to pay extra money for this firm comparing with a firm comprising of either one mechanism alone. For a supplier, as this bundle costs higher but can not be valued higher in response, the extra costs spent are wasted. On the contrary, if a firm consists of two governance mechanisms which complement each other, consumers are more willing to pay higher price for this one-stop shopping bundle than paying double searching efforts to buy them in different places. A firm with single governance mechanism is likely to be valued in a discount than the firm with dual mechanisms in the capital market. In conclusion, firms with substitute governance mechanisms show discount valuation while firms with complementary governance mechanisms show premium valuation.

3. LITERATURE REVIEW

3.1. INDEPENDENT DIRECTOR AND FIRM PERFORMANCE

Until recently, most research on the impact of independent director is empirical, and the results are mixed (Becht *et al.* 2003 p.31). While some research in US find that companies with higher percentage of independent director are more likely to dismiss the poorly performed CEO (Weisbach 1988 cited in Becht *et al.* 2003 p.31-32), and have higher appointment announcement date equity abnormal returns (Rosenstein and Wyatt 1990 cited in Becht *et al.* 2003 p.32), other research find that board compositions are unrelated to firm performance (Hermalin and Weisbach 2003).

Regarding international corporate governance literatures, early Japanese evidence shows that appointment of independent director from bank to non-financial companies stabilize and modestly improve firm performances, measured by stock returns, operating performance and sales growth (Kaplan and Minton 1994). In European countries, the role of the board of director is usually not prescribed in law, as Europeans do not consider shareholder wealth maximization as the paramount goal of a corporation (Wymeersch 1998 cited in Denis and McConnell 2003 p.6). Nevertheless, starting from the Code of Best Practice in UK in year 1992, European countries have begun to embrace the idea of board composition appropriateness (Denis and McConnell 2003 p.7). The evidences in UK are mixed as well. While the result of Dahya *et al.* (2002 cited in Denis and McConnell 2003 p.7) shows that the independent director is associated with higher management turnover following poor performance, Frank *et al.* (2001 cited in Denis and McConnell 2003 p.7) find that in poor performing firms, independent director impedes discipline of poorly-performing managers.

In terms of emerging market, Korea instituted outside director after Asian financial crisis under the command of International Monetary Fund (IMF), requiring all the public-listed firm to have at least 25 percent of the board comprising of outside directors, and the empirical result shows that the valuation effect of outside director is strongly positive (Choi *et al.* 2007). China instituted outside director in 2001 after several corporate governance scandals, yet the empirical result shows that outside directors only have positive impact on sales growth but little impact on financial performance measured by return on equity (Peng 2004 and Clarke 2006).

3.2. DOMESTIC BLOCKHOLDER AND FIRM PERFORMANCE

Blockholder utilizes its influence on management to make decisions that increase overall shareholders' welfare and is a candidate solution to mitigate the agency problem (Denis and McConnell 2003). Among them, institutional investor is becoming increasingly prominent for its sophisticated and active investing style (Gillan and Starks 2000). Literatures of institutional investor are inconclusive. Although Hartzell and Starks (2003 cited in Gillan 2006) approve the impact of concentrated institutional ownership in moderating executive compensation, others argue that interest conflictions (Woidtke 2002 cited in Gillan 2006) and business ties (Davis and Kim in press cited in Gillan 2006) compromise the monitoring role of institutional investors. In Asia, Mitton (2002) acknowledges the positive effect of outside blockholder on firm's performance immunity against financial distress. Korean evidence are inconclusive, while Chang and Hong (2000) find that group-affiliated firms are benefit from group member through resources sharing, Choi *et al.* (2007) find that domestic institutional investors such as Chaebol or family control are negative or insignificant associated with firm performance. In Taiwan, Filatotchev *et al.* (2005) find that institutional investors have positive impact on firm

performance.

3.3. FOREIGN BLOCKHOLDER AND FIRM PERFORMANCE

Starting from the end of year 2003, the regulation of Qualified Foreign Institutional Investor (QFII) and investment amount ceiling for foreign institutions are abolished (United Group Daily News 2003). As the equity markets are increasingly globalizing and integrating, foreign institutions start to play an important role in the Taiwanese equity market, and empirical studies start to pay attention to their differently investment objectives and decision-making horizons (Filatotchev *et al.* 2005). Most research acknowledge their contributions to firm performance, with their more experienced monitoring ability (Thomsen and Pedersen 2000), more abundant international financial resources (Taylor 1990), and more professional strategic expertise (Tihanyi *et al.* 2003). Evidence in Korea shows that foreign investor has significant positive valuation effect (Choi *et al.* 2007). Evidence in Taiwan also confirms that foreign bank investment is significant positive associated with firm performance measured by return on capital and market to book ratios (Filatotchev *et al.* 2005).

3.4. SHAREHOLDING LEVERAGE AND FIRM PERFORMANCE

Shareholding leverage is embodied in two forms: one is the deviation of control rights away from cash flow rights, and the other is the pledge ratio. La Porta *et al.* (cited in Claessens *et al.* 2000) initiate the discussion of ultimate control, and find that ownership and controlling rights can be separated to the benefit of incumbents. When control rights bring about private benefits that have value beyond the cash flow rights, incumbents have incentives to hold excess control rights than cash flow rights, by cross holdings, design of superior-voting shares, and pyramid structure (Denis and

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McConnell 2003 p.16). Bebchuk *e al.* (2000) argue that deviation of control rights away from cash flow rights creates large agency cost. Therefore, investor protection appears to improve with the concentration of cash flow rights, but decreases as the controlling shareholders acquire more control rights in excess of their cash flow rights (Durnev and Kim 2005). An empirically research across 18 emerging countries has demonstrated this viewpoint, discovering that accumulation of control rights in excess of cash flow rights is generally value-reducing for a company (Lins 2003 cited in Denis and McConnell p.18). In East Asia, Classens *et al.* (2000) find that the deviation of control rights and cash flow rights is especially pronounced in family-controlled firms in Korea, Singapore and Taiwan, while less common in Japan. In Western Europe, Faccio and Lang (2002) only find significant discrepancy of control rights and cash flow rights in Switzerland, Norway, and Italy.

In terms of pledge ratio, pledging for loans effectively reduces the funds required for shareholding, resulting in personal credit expansion and over-investment (Lee and Yeh 2004). In Korea, Joh (2003) finds that before the financial crisis, firms with higher disparity of control rights and cash flow rights are associated with lower profitability, especially in public-listed firms. Evidence in Taiwan shows that pledge ratio has better explanatory ability than discrepancy of control rights and cash flow rights when it comes to abnormal equity returns (Chen 2003). Yeh *et al.* (2003) suggest that Classens *et al.* (2000) underestimate the control right of the controlling shareholder in Taiwan due to the insufficient disclosure of ultimate control. Yeh *et al.* (2003) recalculate the discrepancy of control rights and pledge ratio during 1997-1998 in Taiwan, and find that these two measurements are negatively associated with firm value. Further, Lee and Yeh (2004) find that these two measurements are associated with higher possibilities of financial distress.

3.5. BLOCKHOLDER AND INTERACTION

Some previous studies investigate how blockholder interacts with other conditions. Regarding the interaction between takeover mechanism, Grossmand and Hart (1980 cited in Becht *et al.* 2003 p.24) find that blockholder facilitates the implement of takeover activities; and Cremers and Nair (2005) prove that the other way around relationship is true. In terms of the interaction between market liquidity, Hirschman (1970 cited in Becht *et al.* 2003 p.25) suggests that blockholder can not be relied upon once the market has abundant liquidity and the blockholder has the option to sell the stake rather than to intervene. This explains the reason why in US market blockholder has less incentive to monitor management than many other emerging countries (Mayer 1988, Black 1990, Coffee 1991, Roe 1994 and Bhide 1993 cited in Becht *et al.* 2003 p.25). To summarize, blockholder mechanism is complementary to anti-takeover mechanism and relies on the incentive rooted in the illiquid secondary market to function well.

3.6. ABNORMAL RETURN, VALUATION AND CORPORATE GOVERNANCE

remers and Nair (2005), whose methodology is adopted in this thesis, examine how governance mechanisms interact in being associated with equity abnormal returns, yet this these investigates how governance mechanisms interact in being associated with firm valuation. Regarding abnormal return, Gompers *et al.* (2003) find intriguing evidence and conjecture that investors are surprised by the higher-than-expected agency costs resulted from weaker corporate governance, and hence firm with weak governance has significantly negative equity abnormal returns and vice versa. However, Core *et al.* (2006) detect analysts forecasting errors and earning announcement date abnormal returns as measurements of the accuracy of investor expectation and uncover that investors have correctly forecasted the agency cost

resulted from different corporate governance practices between companies beforehand. Furthermore, after either extending the sample period to year 2000-2003 or excluding the technology firms from the original sample period, the significant relationship between equity abnormal returns and corporate governance found by Gompers *et al.* (2003) fades out. Consequently, Core *et al.* (2006) conclude that rather than the expectation effect, the abnormal returns to shareholder rights are caused by the larger "new economy pricing puzzle" of the late 1990s.

In terms of valuation and corporate governance, LaPorta *et al.* (1998) argue that greater investor protection increases investors' willingness to provide financing and lead to a lower cost of capital and a higher firm valuation. An empirical study cross 14 emerging market also finds that better corporate governance is significantly correlated with better firm performance and valuation (Klapper and Love 2004). In single country empirical studies, the positive valuation effect of corporate governance, including outside blockholder, foreign institution, and outside director, is also found in China (Bai *et al.* 2004) and Korea (Black *et al.* 2006).

4. DATA AND DESCRIPTIVE STATISTICS

4.1. OVERVIEW

The data of this paper can be classified into three categories: governance-related variables, firm-related variables, and the dependent variable. Table 1 presents the definition of all variables. All of them are extracted from Taiwan Economic Journal Great China Database (TEJ). TEJ is a database specializing in capital market data in Taiwan and China and is the data provider of many professional data providing institutions such as DataStream, and Reuters (TEJ n. d.) The sample contains all the public listed firms in Taiwan Stock Exchange excluding financial institutions from year 2002 to 2006 as 2002 is the first year in which the independent director regulation is partial enforced on newly-public firms. Besides, corporate governance data from year 1996 to 2001 is also supplemented to observe the evolution of corporate governance in Taiwan. In order to avoid endogeneity, all the governance-related variables and firm-related variables are observed one year lagged comparing with their dependent variable counterpart. After dropping those with missing values, there are totally 3436 firm-year in the sample.

4.2. GOVERNANCE-RELATED VARIABLES

In this section, six governance variables, *INDN, INDR, BLK, FBL, CTC, PLG,* and their relevant ordinal or dummy variables, *DIND, DBLK, DFB, DCTC, DPLG,* are elaborated. This paper discusses three primary governance mechanisms in Taiwan: independent director, blockholder, and shareholding leverage. Among them, blockholder refers to institutional investors, comprising of domestic institutional investors and foreign institutional investors, both of which are usually deemed to be a positive impact on corporate governance. Shareholding leverage is embodied in two

forms: deviation of control rights away from cash flow rights, and the pledge ratio. Both of them are negative governance measurement. The higher the pledge ratio or the more the control rights deviated from cash flow rights, the worse the corporate governance is.

In terms of board independence, two variables *INDN* and *INDR* represent the number of independent director and the percentage of independent director among the board, respectively. A dummy variable *DIND* in relate to independent director is created according to the new regulation, taking both absolute number and relative percentage into consideration. The variable *DIND* is coded "1" if the firm has at least two seats of independent director and 20 percent of independent director among the board; otherwise *DIND* is coded "0".

Regarding blockholder, the variable *BLK* is defined as the percentage shareholding of domestic institutions; the variable *FBL* is defined as the percentage shareholding of foreign institutions, calculated as percentage shareholding of foreign financial institutions plus percentage shareholding of other foreign institutions. Meanwhile, an ordinal variable *DBLK* in relate to blockholder and a dummy variable *DFB* in relate to foreign blockholder are created. For *DBLK*, the percentage shareholding of blockholder, *BLK*, of each firm is ranked in a yearly base, and they are equally classified into 4 categories by the quartiles. The ordinal variable *DBLK* is coded "3" if the firm is ranked in the highest quarter; "2" if the firm is ranked in the sub-highest quarter; "1" if the firm is ranked in the sub-lowest quarter; and "0" if the firm is ranked in the lowest quarter. The quarters of the blockholder shareholding percentage each year are listed in Table 2. The dummy variable *DFB* in related to foreign blockholder shareholding percentage is coded "1" if the foreign blockholder shareholding percentage, *FBL*, of the firm exceeds 5 percent and "0" otherwise.

In terms of shareholding leverage, the variable *CTC* is defined as the percentage control rights of the controlling shareholder minus the percentage cash flow rights of the controlling shareholder. This variable is directly extracted from the calculation results in the TEJ database. An ordinal variable *DCTC* in relate to *CTC* is created in the same way as the blockholder variable. Firstly, *CTC* of each firm in the same year is ranked and classified into 4 categories by the quarters listed in Table 2. Secondly, the ordinal variable *DCTC* is coded "0" if the firm is ranked in the highest quarter; "1" if the firm is ranked in the sub-highest quarter; "2" if the firm is ranked in the sub-lowest quarter; and "3" if the firm is ranked in the lowest quarter. The reason why the coding logic is contrary to that of blockholder-related ordinal variables is that *CTC* is a negative governance measurement. Higher deviation of control rights away from cash flow rights implies higher agency problem. Therefore, "3" refers the level of worst corporate governance, while "0" refers the level of best corporate governance.

Regarding the second proxy of shareholding leverage, the pledge ratio, the variable *PLG* is defined as the percentage of the shareholding of controlling shareholding pledged for bank loans (Lee and Yeh 2004). This variable is also directly extracted from the TEJ database. A related dummy variable *DPLG* is defined basing on the standard of a recently proposing regulation, which submits that the controlling shareholders of public-listed firms can no longer borrow from the bank whenever the pledge ratio exceeds 60 percent (United Group Daily News 2007). Accordingly, the dummy variable *DPLG* is coded "0" if the pledge ratio exceeds 60 percent and "1" otherwise.

4.3. FIRM-RELATED VARIABLES

This section introduces firm related variables including *SIZE, LEV, RET, FCF, BNS, G,*

and *ROA*. In order to observe the valuation effect of corporate governance, the impacts of firm specific characteristics should to be controlled. *SIZE* is defined as the natural log of total assets. *LEV* is defined as the percentage of total debt to total assets and measures thes credit risk of the firm. *RET* is defined as one minus the dividend ratio and implies the growth prospect ex ante. *FCF* is defined as earnings before depreciation, interests and tax (EBDIT) minus interests, tax, and investment expenditure, scaled by total assets. It is a measurement of liquidity and the managerial competence. *BNS* is defined as the market value of stock bonus scaled by net income, and measures the level of employee alignment effect. *G* is defined as the growth rate of sales and describes the growth prospect ex post. *ROA* is defined as the net income scaled by the total assets and is a measurement of operating performance. Each of these variables is industry-adjusted by subtracting the industrial yearly medium of this measure following Gompers *et al.* (2003). The industry identification is based on the Taiwan Stock Exchange industry category.

4.4. DEPENDENT VARIABLE-TOBIN'S Q

The dependent variable in this paper is firm valuation measured by Tobin's Q. Tobin's Q is calculated as the market value of total assets divided by the book value of total assets, where the market value of total assets is computed as book value of total assets plus the market value of common stock less the book value of common stock following Gompers *et al.* (2003). The variable *ADJQ* is industry-adjusted by subtracting the industrial-yearly medium in order to eliminate the industry impact.

4.5. DESCRIPTIVE STATISTICS

The descriptive statistics of the variables are listed in Table 3. From 2002 to 2006, there are, in total, 3,436 firm-year samples. On average domestic institutional

investors hold 35 percent of the share while foreign institutional investors hold 6 percent. The domestic institutional shareholding outweighs the foreign institutional shareholding. Both domestic and foreign institutional shareholding percentage deviate largely, from 0 percent to 98.59 percent for domestic institutions and to 82.29 percent for foreign institutions, implying that institutional investors, especially foreign institutional investors, focus on some specific stocks.

The deviation of control rights away from cash flow rights is 5.56 percent on average. In other words, in Taiwan, the controlling shareholders hold 5.56 percent more control rights than cash flow rights on average. However, the inter-firm difference is tremendous, from the lowest 0 percent to the highest 88.64 percent, revealing that the corporate governance qualities in Taiwan deviate enormously. The average pledge ratio is 9.82 percent, implying that 9.82 percent of the shareholding of the controlling shareholder is financed by the bank pledge loan on average. Again there are vast differences between firms, ranging from 0 percent to 100 percent. In order to compare these different governance mechanisms, they are transformed into ordinal or dummy variables.

The Tobin's Q on average is 132%, implying that on average Taiwanese firms have assts market values of 1.32 times their book value. The rest of the variables are the industrial-adjusted firm specific characteristics.

Table 4 presents the evolution of corporate governance from year 1997 to 2006. Before the regulation partially enforce in 2002, although there are some firms set independent director, the maximum number of independent director does not exceed 2 and the maximum ratio of independent director does not exceed 20 percent. After year 2002, the maximum number of independent director exceeds 2 and the maximum ratio of independent director exceeds 20 percent.

Regarding blockholder, the annual average of domestic blockholder percentage shareholding is quite stable. In terms of foreign blockholder, although the regulation on qualified foreign institution investor (QFII) and the investment limit of $3 billion are released starting from year 2004, the change of foreign institutional shareholding percentage is not very clear. The average foreign institutional shareholding percentage changes from 5.06 percent in 2003 to 5.43 percent in 2004, and the maximum foreign institutional shareholding percentage changes from 71.8 percent in 2003 to 82.9 percent in 2004. The possible reason is that the signal effect of the abolishment of QFII regulation is more substantial than the actual effect since in 2003 none of the foreign institution reaches 83 percent of the investment quota, and it is very unlikely for a foreign institution to invest more than $3 billion, equivalent to NT$ 100 billion, in Taiwan all at once (United Group Daily News 2003).

In regard to shareholding leverage, the discrepancy of control rights and cash flow rights is quite stable, maintaining at about 5 percent on average over the ten years. However the maximum of discrepancy of control rights rises from 44.92 percent in 1997 to 74.16 percent in 2006, implying that the inter-firm differences might increase and shareholding leverage tactic has been utilized by certain firms more extremely over the ten years. The pledge ratio improves over the ten years, from 14.09 percent in 1997 to 8.32 percent in 2006, reflecting the fact that people paying more and more attention to the pledge problem of controlling shareholders.

5. METHODOLOGY AND RESEARCH RESULTS

5.1. PRELIMINARY REGRESSION

The first stage of this research is to clarify which governance mechanisms show significant valuation effect after controlling for other firm specific characteristics by regression analysis. Preliminary regression equations are estimated as the following equation (1) and (2):

$$ADJQ = \alpha + \beta_i GM_i + \beta_2 SIZE + \beta_3 LEV + \beta_4 RET + \beta_5 FCF + \beta_6 BNS + \beta_7 G + \beta_8 ROA + \varepsilon_i$$
$$\text{where } GM_i = DBLK, DFB, DCTC, or\ DPLG. \tag{1}$$

$$ADJQ = \alpha + \beta_1 DIND + \beta_2 DBLK + \beta_3 DFB + \beta_4 DCTC + \beta_5 DPLG$$
$$+ \beta_6 SIZE + \beta_7 LEV + \beta_8 RET + \beta_9 FCF + \beta_{10} BNS + \beta_{11} G + \beta_{12} ROA + \varepsilon_i \tag{2}$$

The first equation tests the governance mechanism valuation impact in isolation and the second equation tests the joint valuation impact of all governance mechanisms. In order to avoid endogeneity, all the governance-related variables and firm-related variables are observed one year lagged comparing with their dependent variable counterpart. The null hypothesis is $\beta_i = 0, i = 1...4$. If any of the parameters of governance-related variables is statistically significant, it indicates that the governance mechanism has significant valuation effect. The estimated parameters of equation (1) are presented in the first five column of Table 6 and the estimated parameters of equation (2) are presented the last column of Table 6.

As shows in the first five column of Table 6, *DIND DBLK*, and *DFB* all have significant positive parameters under α=0.01 significance level yet *DCTC* and *DPLG* do not have, indicating that the mechanisms of independent director, domestic blockholder, and foreign blockholder all have significant valuation effects while discrepancy of control rights and pledge ratio do not.

The result of equation (2) shows in the last column of Table 6. The result shows that both *DBLK* and *DFB* have significantly positive valuation effects under α=0.01 significance level and *DIND* has significant positive valuation effects under α=0.05 significant level. *DCTC* and *DPLG* still do not show significance.

In terms of other firm specific variables, there are some other significant valuation factors revealed in Table 6. Firstly, leverage has a significantly negative impact on firm valuation which fit in with the expectation that leverage increases the credit risk and discount firm value. Secondly, both bonus and ROA show significant positive valuation effects. The former reveals the employee incentive effect and the latter shows the operating profitability is value increasing.

5.2. GRAPHIC ANALYSIS OF GOVERNANCE MECHANISM VALUATION EFFECT

5.2.1 VALUATION EFFECT OF SINGLE GOVERNANCE MECHANISM

The second stage of this research follows Gompers *et al.* (2003), calculating and comparing firm valuation (which, in Gompers *et al.*'s (2003) case, is firm's equity abnormal returns) under different levels of corporate governance, to distinguish whether the governance mechanism is associated with firm valuation. Here a graphical presentation is utilized together with the table to facilitate analyzing the structures and trends of governance mechanisms' valuation effect under different levels. The following step executions are performed on each governance mechanism in turn in order to recognize the validity of each governance mechanism. First of all, a regression equation is estimated to derive a residual Tobin's Q in which the effects of the other 3 governance mechanisms plus other firm factors are eliminated. To examine the valuation effect of independent director, the following regression equation is estimated:

$$ADJQ_{excind} = \alpha + \beta_1 DBLK + \beta_2 DFB + \beta_3 DPLG + \beta_4 CTC + \beta_5 SIZE + \beta_6 LEV + \beta_7 RET$$
$$+ \beta_8 FCF + \beta_9 BNS + \beta_{10}G + \beta_{11}ROA + \varepsilon_i \qquad (3)$$

To examine the valuation effect of domestic institutional investor, the following regression equation is estimated:

$$ADJQ_{excblk} = \alpha + \beta_1 DIND + \beta_2 DFB + \beta_3 DPLG + \beta_4 CTC + \beta_5 SIZE + \beta_6 LEV + \beta_7 RET$$
$$+ \beta_8 FCF + \beta_9 BNS + \beta_{10}G + \beta_{11}ROA + \varepsilon_i \qquad (4)$$

To examine the valuation effect of foreign institutional investor, the following regression equation is estimated:

$$ADJQ_{excfbl} = \alpha + \beta_1 DIND + \beta_2 DBLK + \beta_3 DPLG + \beta_4 CTC + \beta_5 SIZE + \beta_6 LEV + \beta_7 RET$$
$$+ \beta_8 FCF + \beta_9 BNS + \beta_{10}G + \beta_{11}ROA + \varepsilon_i \qquad (5)$$

Second, samples are separated into different groups by the levels of governance mechanism. Third, the average residual Tobin's Q of each group is calculated and a mean comparison graph is drawn accordingly. Figure 1 to Figure 3 present the average residual Tobin's Q under different levels of independent director, domestic blockholder, and foreign blockholder respectively. If a clear incremental trend is shown in the graph, it indicates that higher level of the governance mechanism is associated with better firm valuation in the stock market. Figure 1 presents the mean residual Tobin's Q for firms which have accommodated the new regulation of independent director (*DIND*=1) and firms have not accommodate (*DIND*=0). As shown in Figure 1, firms with sufficient board independence has 4.5 percent higher valuation than firms has not given other things being equal. Figure 2 presents the mean residual Tobin's Q for firms with different level of percentage shareholding by domestic institutional investors. As a clear trend displayed in Figure 2, firms with more share percentage hold by domestic institutional investors are associated with higher market valuation. Firms with the highest percentage of domestic institutional

shareholding enjoy 6.82 percent premium market value. Figure 3 presents the mean residual Tobin's Q for firms with lower or higher than 5 percent of shares hold by foreign institutional investors. Figure 3 shows that firm with higher foreign institutional shareholding percentage enjoy 7.6 percent higher valuation in the market. Overall, the residual valuation graphic analysis concludes that independent director, domestic blockholder, and foreign blockholder are associated with higher valuation premium.

5.2.2 VALUATION EFFECT OF MULTIPLE GOVERNANCE MECHANISMS

The third stage of this research follows Cremers and Nair's (2005) methodology, analyzing the valuation effect (which, in Cremers and Nair's (2005) case, is firm's equity abnormal returns) of one governance mechanism condition on the level of the other governance mechanism. The main objective of this step is to find the answer of the following question:

Are firms with two strong governance mechanisms valued higher than firms with only one of them?

A two-step execution is performed to each pair of governance mechanisms in turn to examine how governance mechanisms interact to affect firm valuation and distinguish the substitution effect or complementary effect. This research focuses on the interactions of two pairs of governance mechanisms: domestic blockholder vs. independent director, and foreign blockholder vs. independent director. Firstly, a regression is estimated to derive a residual Tobin's Q in which the effects of the other governance mechanisms plus other firm factors have been eliminated. The following three regression equations are estimated to derive the residual Tobin's Q for observing the interaction of *DIND* vs. *DBLK*, and *DIND* vs. *DFB* respectively.

$$ADJQ_{excib} = \alpha + \beta_1 DFB + \beta_2 DCTC + \beta_3 DPLG + \beta_4 SIZE + \beta_5 LEV$$
$$+ \beta_6 RET + \beta_7 FCF + \beta_8 BNS + \beta_9 G + \beta_{10} ROA + \varepsilon_i \qquad (6)$$

$$ADJQ_{excif} = \alpha + \beta_1 DBLK + \beta_2 DCTC + \beta_3 DPLG + \beta_4 SIZE + \beta_5 LEV$$
$$+ \beta_6 RET + \beta_7 FCF + \beta_8 BNS + \beta_9 G + \beta_{10} ROA + \varepsilon_i \qquad (7)$$

Secondly, samples are cross selected into $N \times M$ different groups, where N and M denote the levels of the two governance mechanisms. Specifically, the variable *DIND* has two levels and the variable *DBLK* has four levels. Thus the residual Tobin's Q derived from equation (6) are separated into $2 \times 4 = 8$ groups. On the other hand, the variable *DIND* and *DFB* both have two levels. Thus the residual Tobin's Q derived from equation (7) are separated into $2 \times 2 = 4$ groups. Third, the average residual Tobin's Q of each group is calculated and listed in the histogram. This figure indicates the joint residual valuation effect of different of corporate governance mechanisms packages. How much premium market value a set of governance mechanisms can earn implies the market viewpoint of how the two governance mechanisms interact. Figure 4 presents the conditional residual Tobin's Q of independent director and domestic blockholder. Samples are separated into $2 \times 4 = 8$ groups, comprising all the possible arrangement of these two governance mechanisms. For example, the left pillar in the histogram shows the mean residual Tobin's Q of firms in which both governance mechanisms are weak; while the right pillar in the histogram shows the mean residual Tobin's Q of firms in which both governance mechanisms are strong. As shown in Figure 4, on average, firms with unqualified board independence and the highest percentage institutional investor shareholding enjoy 5.75 percent premium market value and firms with qualified board independence and the highest percentage institutional investor shareholding enjoy 8.85 percent premium market value. Firms with multiple strong governance mechanisms enjoy a higher premium valuation than firms with strong blockholder in isolation.

Figure 5 presents the conditional residual Tobin's Q of independent director and foreign blockholder. Samples are separated into $2 \times 2 = 4$ groups, comprising all the possible arrangement of these two governance mechanisms. For example, the left pillar in the histogram shows the mean residual Tobin's Q of firms in which both governance mechanisms are weak; while the right pillar in the histogram shows the mean of residual Tobin's Q of firms in which both governance mechanisms are strong. As shown in Figure 5, firms with qualified board independence and the highest percentage foreign institutional investor shareholding enjoy 10 percent premium market value while firms with unqualified board independence and the highest percentage foreign institutional investor shareholding only enjoy 2.8 percent premium market value. Firms with multiple strong governance mechanisms enjoy a higher premium valuation than firms with strong foreign blockholder in isolation.

5.3. GOVERNANCE MECHANISM INTERACTION TEST

The forth step of this research follows Cremers and Nair (2005), utilizing the regression approach to distinguish the substitution effect and complementary effect between governance mechanisms. In the beginning, four variables capture the substitution effect and the complementary effects have to be defined. Given that governance mechanisms do associate higher valuation, if two governance mechanisms are substitutes, then it is the level of the more sophisticated one that matters to the firm valuation, because the effect of the more sophisticated governance mechanism outweighs and substitutes the effect of the less sophisticated mechanism. Accordingly, the following two variables capture the substitution effect between pairs of governance mechanisms. The variable *MAXIB* denotes the maximum level of *DBLK* and three times of *DIND*, the two variables representing domestic blockholder and independent director. The variable *MAXIF* denotes the maximum level of three times

of *DIND* and three times of *DFB*, the two dummy variables representing independent director and foreign blockholder. Contrarily, if two governance mechanisms are complements, then it is the level of the less sophisticated one that matters to the firm valuation, because it is the level two governance mechanisms both attain. Accordingly, the following two variables capture the complementary effect between pairs of governance mechanisms. The variable *MINIB* denotes the minimum level of three times of *DIND* and *DBLK*, the two variables representing independent director and domestic blockholder. The variable *MINIF* denotes the minimum level of three times of *DIND* and three times of *DFB*, the two dummy variables representing independent director and foreign blockholder. After defining the necessarily variables, the following regression equation is estimated to distinguish whether the substitution effect and complementary effect determine the firm valuation given other things being equal.

$$
\begin{aligned}
ADJQ = \alpha &+ \beta_1 MAXIB + \beta_2 MINIB + \beta_3 MAXIF + \beta_4 MINIF \\
&+ \beta_5 SIZE + \beta_6 LEV + \beta_7 RET + \beta_8 FCF + \beta_9 BNS + \beta_{10} G + \beta_{11} ROA + \varepsilon_i
\end{aligned} \tag{8}
$$

The null hypothesis is $\beta_i = 0, i = 1...4$. If the parameter of *MAXIB* or *MAXIF* is statistically significant, it indicates that the valuation effects of the corresponded two governance mechanisms substitute each other. On the contrarily, if the parameter of *MINIB* or *MINIF* is statistically significant, it indicates that the valuation effects of the corresponded two governance mechanisms complement each other. The results are shown in the first column of Table 7.

As presented in Table 7, the variables *MAXIB* are significantly associated with higher valuation under $\alpha = 0.05$ significance level, indicating that independent director and domestic blockholder can replace each other; the market views these two governance mechanisms as substitutes. On the other hand, *MINIF* shows significant

association with higher firm valuation under $\alpha = 0.01$ significance level, indicating that independent director and foreign blockholder can facilitate each other; the market views these two governance mechanisms as complements.

5.4. FIRM SPECIFIC CHARACTERISTIC DEPENDENT TEST

After distinguishing the interaction between governance mechanisms, the fifth step of this research follows Cremers and Nair (2005), considering the interaction between governance mechanisms in the presence of firm size and leverage. The main objective of this step is to examine how the governance mechanisms' interaction depends on firm specific characteristics. In the beginning, two pairs of variable denote size and leverage are defined respectively. Firstly, regarding firm size, two dummy variables *SMALL* and *LARGE* take the value of 1 for firms with lower than medium and higher than medium industry-adjusted size respectively and 0 otherwise. Secondly, regarding leverage, two dummy variables *LOWGEAR* and *HIGHGEAR* take the value of 1 for firms with lower than first quartile and higher than first quartile industry adjusted leverage respectively and 0 otherwise. After defining the necessary variables, the following two regression equations are estimated in sequence to examine how governance mechanism interactions depend on firm size and leverage.

$$\begin{aligned} ADJQ = \alpha &+ \beta_1 MAXIB \times SMALL + \beta_2 MAXIF \times SMALL + \beta_3 MINIB \times SMALL \\ &+ \beta_4 MINIF \times SMALL + \beta_5 MAXIB \times LARGE + \beta_6 MINIF \times LARGE \\ &+ \beta_7 SIZE + \beta_8 LEV + \beta_9 RET + \beta_{10} FCF + \beta_{11} BNS + \beta_{12} G + \beta_{13} ROA + \varepsilon_i \end{aligned} \quad (9)$$

$$\begin{aligned} ADJQ = \alpha &+ \beta_1 MAXIB \times LOWGEAR + \beta_2 MAXIF \times LOWGEAR \\ &+ \beta_3 MINIB \times LOWGEAR + \beta_4 MINIF \times LOWGEAR \\ &+ \beta_5 MAXIB \times HIGHGEAR + \beta_6 MAXIF \times HIGHGEAR \\ &+ \beta_7 SIZE + \beta_8 LEV + \beta_9 RET + \beta_{10} FCF + \beta_{11} BNS + \beta_{12} G + \beta_{13} ROA + \varepsilon_i \end{aligned} \quad (10)$$

To avoid perfect collinearity with the intercept, the interaction term $MINIB \times LARGE$, $MAXIF \times LARGE$ and $MIN\text{-}\times HIGHGEAR$ are omitted from

either regression equations.

The second and third column of Table 7 presents the regression results of both regression equations. The null hypothesis is $\beta_i = 0, i = 1...6$. The second column presents the result of governance mechanism interaction in the presence of firm size; the second column presents the result of governance mechanism interaction in the presence of firm leverage. As shown in the second column, the parameters of $SMALL \times MINIF$ and $LARGE \times MAXIB$ are significant under $\alpha = 0.01$ significance level, implying that the complementary effect between independent director and foreign blockholder is more likely to appear in small firms and the substitution effect between independent director and domestic blockholder is more likely to appear in large firms. The result indicates that governance mechanisms' substitution or complementary interactions depend on the firm characteristic. Specifically, in large firms, one point increase in the higher of the score of domestic blockholder shareholding and independent director leads to 4.42 percent incremental market valuation premium; one point increase in the lower of the score of foreign blockholder shareholding and independent director leads to 4.49 percent higher market valuation. The other parameters are insignificant.

The third column of Table 7 presents the estimates of equation (10). As it shows, the substitution effect between independent director and domestic blockholder appears in high-leveraged firms under $\alpha = 0.05$ significance level while the complementary effect between independent director and foreign blockholder appears in low-leveraged firms under $\alpha = 0.01$ significance level, indicating that governance mechanisms' substitution or complementary interactions depend on the firm characteristic, and the complementary effect are especially active in firms with low leverage while the substitution effect are especially active in firms with high leverage.

Specifically, in firms with low leverage, one point increase in the lower of the score of foreign blockholder shareholding and independent director leads to 9.35 percent higher market valuation; in firms with high leverage, one point increase in the higher of the score of domestic blockholder shareholding and independent director leads to 2.59 percent incremental market valuation premium.

5.5. ROBUST TEST

This section testify the robustness of the governance mechanism interaction test in equation (8) and firm characteristic dependence test in equation (9) and (10) by incrementally controlling for board size (*BRD*) with the results presented in Table 8. The results show that board size is insignificantly negative associated with firm value. This result corresponds to the argument of Jensen (1993), Yermack (1996), Eisenberg, Sundgren and Wells (1998) that there is a cost of slower decision-making and having a less candid culture with larger boards. Other results remain the same. The results of the governance mechanism interaction test in equation (8) and firm characteristic dependence test in equation (9) and (10) is robust to controlling for board size.

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6. INTERPRETATION AND IMPLICATION

This thesis examines the necessity of multiple governance mechanism design. The research process can be separated into three parts: the first part confirms the effectiveness of each governance mechanism; the second part distinguishes whether incremental governance mechanism adds more value or not. The third part examines if the governance mechanism interaction depends on firm characteristics.

The first part clarifies which governance mechanism is effective in eliminating the agency problem and thus augmenting firm valuation. The preliminary regression shows that firms with higher percentage shareholding by institutional investors, either domestic or foreign, are associated with higher market valuation premium, implying that institutional investors, based on superior professional know-how and abundant incentive, play important roles in monitoring the incumbents and effectively increase firm value in Taiwan. Furthermore, the regression results also show that firm with qualified independent director arrangement are associated with higher market valuation premium, implying that independent director is also a vigorous governance mechanism in monitoring the incumbents and increasing firm value. Meanwhile, the valuation effect of discrepancy of control rights and pledge ratio are not significant in the regression results. The reason why the stock market do not giver premium value to firms for temperance in discrepancy of control rights and pledge ratio might results from the specific business background in Taiwan that cross-holding, pyramid shareholding structure and pledge ratio are commonly utilized even in many first-tier companies such as Foxconn, Formosa Plastic Group and China Trust (United Group Daily News 2006). In addition, both functions, i.e. less discrepancy of control rights or less pledge ratio, are merely passive governance mechanisms that reduce incumbents' incentive to seek private benefits, instead of active monitoring

mechanism to prohibit them. Last but not least, the reason why the result contradicts to that of Yeh *et al.* (2003) might result from the different economic conditions in the two sample periods. As the discrepancy of control rights mostly appears in the best and the worst firms like a "M distribution", the Asia financial crisis in the late 90's has washed out most of the worst firms and thus the negative relationship between the discrepancy of control right and firm value is not so significant later on. In conclusion, in Taiwanese market, independent director and blockholder might be the definitive governance mechanisms in firm valuation. The results of graphic analysis also correspond to this result, showing that better board independence and higher percentage of blockholder shareholding, either domestic or foreign, contribute incremental premium on firm value given other things being equal. A clear trend of increasing value can be seen for firms with either better board independence or higher blockholder shareholding from the graphs.

The second part tries to find out whether two joint governance mechanisms performs better in eliminating agency problem than single governance mechanism. The results of graphic analysis show that the highest percentage of blockholder shareholding combining with qualified board independence are associated with higher market valuation than either highest percentage of blockholder shareholding or qualified board independence in isolation. It denotes that both blockholder and independent director are valued higher when coexisting with each other than functions alone. The results indicate that market may view multiple governance mechanisms as better shareholding protection mechanism and give it higher premium. The regression shows that when considering independent director and domestic blockholder, the substitution effect outweighs the complement effect in valuation; it is the more sophisticated governance mechanism that matters to the firm valuation. When

regarding independent director and foreign blockholder, the complementary effect outweighs the substitution effect in valuation; it is the more coexisting level that matters to the firm valuation. It indicates that the market views independent director and domestic blockholder as substitutes and only gives premium value to the highest level of either of them. On the other hand, market views independent director and foreign blockholder as complements and only give premium value to the extent in which both governance mechanisms coexist. The reason why the governance effect of independent director substitutes the effect of domestic blockholder while complements the effect of foreign blockholder might be rooted in the time horizon of the incentives. As foreign blockholder prefers short-term investment, it tends to monitor management by the short-term performance. In contrast, domestic blockholder prefers relatively long-term investment, so it tends to monitor management by the long-term performance. Independent directors are induced by the "reputation incentive." As reputation can not be built in a short period of time, independent directors also tend to monitor management by the long-term performance so that they can gain and maintain long-term prestige. Therefore the monitoring effect of independent directors overlaps the effect of domestic blockholder while complements the effect of foreign blockholder.

The third part examines whether the interaction between governance mechanisms are specific in firms with certain characteristics. The results show that the substitution effect between independent director and domestic blockholder is especially significant in large or high-leveraged firms, and the complement effect between independent director and foreign blockholder is especially significant in small or low-leveraged firms. Regarding the size factor, it perhaps is due to the reason that large firms can attract more attention of institutional investors and can recruit more competent

independent director in an independent director market with excess demand, while small firms are inferior in attracting the attention of blockholder and find it more difficult to recruit prestigious independent director, thus the governance mechanism quality of large firms tend to be stronger and can function well independently and the governance mechanism quality of small firms tend to be weaker and can not function well without the facilitating of the other mechanism. In terms of the leverage factor, in high-leveraged firms the free cash flow is constrained which serves as a self-enforcing function to prevent management appropriation (Grossman and Hart 1982, Jensen, 1986, 1993 cited in Gillan 2005). Accordingly, the agency problem in firms with high leverage is less serious and hence independent dependent and domestic blockholder can substitute each other and function well in isolation. Contrarily, the agency problem in low-leveraged firms are severer and hence independent director and foreign blockholder can not function well along; instead, they need the complement of each other.

To conclude, while in large or high-leveraged firms the design of an optimal governance mechanism should avoid overlapping problem and should focus on refining single governance mechanism, in small or low-leveraged firms the design of an optimal governance mechanism should diversify to multiple governance mechanisms and hence enable them to facilitate each other.

7. CONCLUSION

This thesis, motivated by the newly-instituted regulation, discusses the appropriateness of multiple governance mechanism design in Taiwanese market. The research follows the issue and the methodology of Cremers and Nair (2005) about governance mechanism interaction, and adds elements in relate to other governance mechanisms, such as independent director, and elements specific in the emerging market, such as the discrepancy of control rights and the pledge ratio.

The following three conclusions are raised from the research results. Firstly of all, in Taiwanese market, independent director, as well as domestic institutional investor shareholding and foreign institutional investor shareholding all have incremental effects in eliminating agency problem and increasing firms' market valuation premium. Contrarily, discrepancy of control rights and pledge ratio show insignificant valuation effects.

Second, firms with strong domestic or foreign blockholder and sufficient board independence enjoy higher valuation than firms with only strong domestic or foreign blockholder. Moreover, domestic blockholder plays a substitutive role to independent director while foreign blockholder plays a complementary role to independent director. In other words, in firms with sufficient domestic blockholder shareholding, independent director serve as a substitute and the incremental valuation effect is overlapping, while in firms with sufficient foreign blockholder shareholding, independent director serve as a complement and the effects facilitate each other. Thus a cost-efficient governance mechanism design of firms with sufficient domestic blockholder should be concentrating resources on strengthening single governance mechanism, while a cost-efficient governance mechanism design of firms with sufficient foreign blockholder should be diversifying resources to independent

director mechanism.

Third, the substitution effect between governance mechanisms is more significant in large or high-leveraged firms while the complementary effect between governance mechanisms is more significant in small or low-leveraged firms. Therefore firms with large size and high leverage should specifically take into consideration the governance mechanism overlapping problem while firms with small size and low leverage should specifically take into consideration the cooperation function of governance mechanisms.
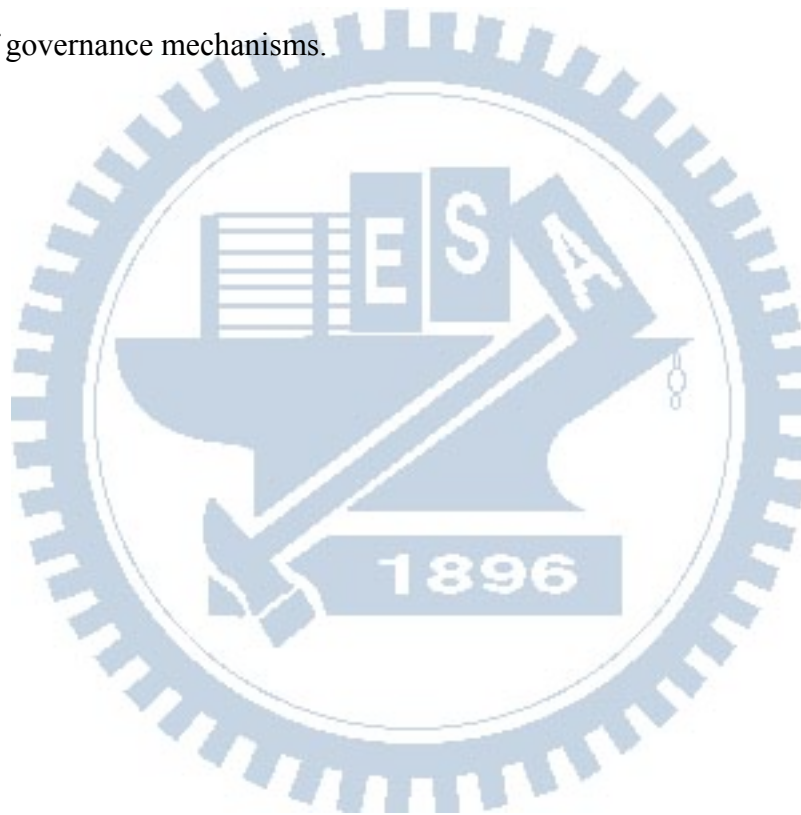
TABLES AND FIGURES

Table 1 definition of variables

Variable	Definition
Governance variables	
INDN	The number of independent director
INDR	The ratio of independent director among the board
BLK	The shareholding percentage of domestic institutional investor
FBL	The shareholding percentage of foreign institutional investor
CTC	The deviation of control rights away from cash flow rights of controlling shareholder
PLG	The percentage of the shareholding of controlling shareholder pledged for bank loans
Governance ordinal variables	
DIND	The dummy variable that takes the value of 1 if the firm has at least two seats of independent director (*INDN*) and 20 percent of independent director among the board (*INDR*), and 0 otherwise
DBLK	The ordinal variable that takes the value of 3 if the percentage of the domestic institutional shareholding (*BLK*) is greater than the 3rd quartile, else takes the value of 2 if *BLK* is greater than the 2nd quartile, else takes the value of 1 if *BLK* is greater than the 1st quartile, and else takes the value of 0
DFB	The dummy variable that takes the value of 1 if the percentage of foreign institutional shareholding (*FBL*) exceeds 5 percent, and 0 otherwise
DCTC	The ordinal variable that takes the value of 3 if the deviation of control rights away from cash flow rights (*CTC*) is less than the 1st quartile, else takes the value of 2 if *CTC* is less than the 2nd quartile, else takes the value of 1 if *CTC* is less than the 3rd quartile, and else takes the value of 0
DPLG	The dummy variable that takes the value of 1 if the pledge ratio (*PLG*) is less than 60 percent and 0 otherwise
Firm-related variables	
SIZE	The natural log of total assets subtract the industrial yearly medium
LEV	Leverage ratio, defined as total debt to total assets and subtract the industrial yearly medium
RET	Retention ratio, defined as one minus the dividend ratio subtract the industrial yearly medium
FCF	Free cash flow, defined as earnings before depreciation, interests and tax (EBDIT) minus interests, tax, and investment expenditure, scaled by total assets, and subtract industrial yearly medium

BNS	The market value of stock bonus scaled by net income and subtract industrial yearly medium
G	The growth rate of sales and subtract industrial yearly medium
ROA	The net income scaled by the total assets and subtract industrial yearly medium

Performance variable

Q	Tobin's Q, defined as the market value of assets divided by the book value of the assets where the market value of assets is computed as book value of assets plus the market value of common stock less the book value of common stock
ADJQ	Tobin's Q subtract industrial yearly medium

Table 2 lower bound of *DBLK* and *DCTC* each year (%)

The percentage of the domestic institutional shareholding (*BLK*) of each firm in the same year is ranked and equally classified into 4 categories by the quartiles. The ordinal variable takes the value of 3 if *BLK* is greater than the 3rd quartile, else takes the value of 2 if *BLK* is greater than the 2nd quartile, else takes the value of 1 if *BLK* is greater than the 1st quartile, and else takes the value of 0. Meanwhile, the deviation of control rights away from cash flow rights (*CTC*) of each firm in the same year is ranked and classified into 4 categories by the quarters. The ordinal variable takes the value of 3 if *CTC* is less than the 1st quartile, else takes the value of 2 if *CTC* is less than the 2nd quartile, else takes the value of 1 if *CTC* is less than the 3rd quartile, and else takes the value of 0.

Year	Q1	Q2	Q3
Lower bound of DBLK			
BLK	*1*	*2*	*3*
2002	19.4100	36.5550	55.1800
2003	17.8800	34.3900	55.7500
2004	17.8400	35.5600	57.7300
2005	18.4600	36.6350	58.9700
2006	18.9400	35.8650	59.0500
Lower bound of DCTC			
CTC	*2*	*1*	*0*
2002	0.0400	1.4050	7.4300
2003	0.0100	1.3700	7.5900
2004	0.0300	1.7300	8.0300
2005	0.0300	1.6250	8.1100
2006	0.0400	1.5000	7.8400

Table 3 descriptive statistics

The table reports the sample number, mean, standard deviation, minimum and maximum of observation of variables. All variables are defined in Table 1. The sample period is from 2002 to 2006. Financial firms and firms with missing data are omitted. All the firm-related variables are industrial-adjusted.

Variable	N	Mean	Std Dev	Minimum	Maximum
Governance variables					
INDN	3436	1.1935	1.5407	0.0000	7.0000
INDR	3436	12.6461	16.3489	0.0000	60.0000
BLK	3436	35.0851	21.7678	0.0000	98.5900
FBL	3436	6.2631	10.9803	0.0000	82.2900
CTC	3436	5.5554	10.3574	0.0000	88.6400
PLG	3436	9.8203	19.3418	0.0000	100.0000
Governance ordinal variables					
DIND	3436	0.3586	0.4796	0.0000	1.0000
DBLK	3436	1.3405	1.0462	0.0000	3.0000
DFB	3436	0.3152	0.4647	0.0000	1.0000
DCTC	3436	1.6091	1.0775	0.0000	3.0000
DPLG	3436	0.9598	0.1964	0.0000	1.0000
Firm-related variables					
SIZE	3436	0.2377	1.2982	-3.0154	5.3398
LEV	3436	-0.8524	15.9109	-58.5229	62.6869
RET	3436	-9.5684	121.7256	-4428.8200	215.4100
FCF	3436	-1.1210	10.6962	-130.8058	39.8557
BNS	3436	3.8028	13.5089	-156.6107	247.4977
G	3436	7.3821	77.1343	-127.5850	2064.1500
ROA	3436	-0.6107	9.5784	-82.2118	34.9217
Performance variable					
Q	3436	132.1773	70.8822	28.9586	1065.6800
ADJQ	3436	16.8005	67.5518	-80.2532	932.0650

Table 4 governance mechanisms condition each year

This table reports the annual sample number, mean, standard deviation, minimum, and maximum of governance-related variables in Taiwan, in order to observe the evolution of corporate governance in Taiwan. Among them, data in year 2002 to 2006 are included in the sample in this research, while data in year 1997 to 2001 are listed only as supplement.

Variable	Year	N	Mean	Std Dev	Minimum	Maximum
Independent director number						
INDN	1997	144	0.0069	0.0833	0.0000	1.0000
	1998	183	0.0055	0.0739	0.0000	1.0000
	1999	203	0.0000	0.0000	0.0000	0.0000
	2000	247	0.0000	0.0000	0.0000	0.0000
	2001	310	0.0000	0.0000	0.0000	0.0000
	2002	354	0.0056	0.1063	0.0000	2.0000
	2003	569	0.7381	1.2823	0.0000	5.0000
	2004	662	1.2100	1.5635	0.0000	7.0000
	2005	791	1.5133	1.6013	0.0000	7.0000
	2006	1060	1.5858	1.6006	0.0000	7.0000
Independent director ratio						
INDR	1997	144	0.0992	1.1905	0.0000	14.2857
	1998	183	0.0607	0.8214	0.0000	11.1111
	1999	203	0.0000	0.0000	0.0000	0.0000
	2000	247	0.0000	0.0000	0.0000	0.0000
	2001	310	0.0000	0.0000	0.0000	0.0000
	2002	354	0.0706	1.3287	0.0000	25.0000
	2003	569	7.8638	13.7182	0.0000	50.0000
	2004	662	12.7345	16.5256	0.0000	57.1429
	2005	791	16.0153	16.9749	0.0000	60.0000
	2006	1060	16.8434	16.9933	0.0000	60.0000
Blockholder shareholding percentage						
BLK	1997	144	34.4391	20.5124	0.4300	80.3000
	1998	183	31.8616	18.4529	0.0000	78.8900
	1999	203	33.1464	18.0926	1.1300	81.0800
	2000	247	35.4381	21.1757	0.8700	100.0000
	2001	310	34.2313	19.4924	0.0000	90.4900
	2002	354	36.1368	19.9341	0.0000	95.6400
	2003	569	34.1200	21.1242	0.0000	96.0700
	2004	662	34.4739	21.4185	0.5300	97.8400

Variable	Year	N	Mean	Std Dev	Minimum	Maximum
	2005	791	35.2934	22.2409	0.0000	98.5900
	2006	1060	35.4782	22.5504	0.0000	98.0000
Variable	Year	N	Mean	Std Dev	Minimum	Maximum
Foreign blockholder shareholding percentage						
FBL	1997	144	7.7581	10.2496	0.0000	43.1800
	1998	183	7.6099	9.6294	0.0000	40.8600
	1999	203	5.7560	8.5694	0.0000	45.2100
	2000	247	5.3544	10.3497	0.0000	82.7200
	2001	310	5.5646	8.9626	0.0000	46.6000
	2002	354	5.5215	9.4511	0.0000	65.2600
	2003	569	5.0655	9.5328	0.0000	71.8000
	2004	662	5.4530	9.8799	0.0000	82.2900
	2005	791	7.4220	12.0655	0.0000	82.1900
	2006	1060	6.7947	11.8483	0.0000	82.1900
Discrepancy of control rights						
CTC	1997	144	5.7688	10.1149	0.0000	46.9200
	1998	183	5.0883	8.6668	0.0000	39.0800
	1999	203	5.1134	9.0548	0.0000	47.7500
	2000	247	5.2099	9.3185	0.0000	44.9400
	2001	310	5.0735	9.2159	0.0000	58.0500
	2002	354	5.3498	10.4279	0.0000	88.6400
	2003	569	5.2286	10.2184	0.0000	67.6600
	2004	662	5.5438	10.3446	0.0000	64.0400
	2005	791	5.6689	10.4822	0.0000	66.7800
	2006	1060	5.7220	10.3364	0.0000	74.1600
Pledge ratio						
PLG	1997	144	14.0922	22.3035	0.0000	88.3200
	1998	183	20.3944	24.8449	0.0000	90.4100
	1999	203	26.8881	28.1382	0.0000	98.2900
	2000	247	20.6091	26.3062	0.0000	95.3700
	2001	310	19.3058	25.9864	0.0000	99.9100
	2002	354	16.1038	24.5059	0.0000	100.0000
	2003	569	10.7647	19.7232	0.0000	95.5200
	2004	662	9.2716	18.3545	0.0000	96.9400
	2005	791	8.7983	18.3323	0.0000	100.0000
	2006	1060	8.3200	18.0762	0.0000	100.0000

Table 5 Pearson correlation coefficient of variables

	INDN	INDR	BLK	FBL	CTC	PLG	SIZE	LEV	RET	FCF	BNS	G	ROA	Q	ADJQ
INDN	1	0.97837	0.05247	0.01674	0.10813	-0.261	-0.1471	-0.04621	-0.01125	0.14198	0.16024	0.0214	0.17389	0.21395	0.15416
		<.0001	0.0021	0.3266	<.0001	<.0001	<.0001	0.0067	0.5097	<.0001	<.0001	0.2099	<.0001	<.0001	<.0001
INDR	0.97837	1	0.01732	-0.00346	0.06863	-0.26299	-0.17697	-0.03679	-0.01464	0.14495	0.16374	0.01866	0.17318	0.21529	0.15561
	<.0001		0.3102	0.8391	<.0001	<.0001	<.0001	0.031	0.3911	<.0001	<.0001	0.2741	<.0001	<.0001	<.0001
BLK	0.05247	0.01732	1	0.45419	0.40865	0.03378	0.31887	-0.0133	-0.01723	0.11057	0.07622	0.06722	0.1748	0.13214	0.14655
	0.0021	0.3102		<.0001	<.0001	0.0477	<.0001	0.4357	0.3126	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
FBL	0.01674	-0.00346	0.45419	1	-0.00115	-0.01062	0.34877	-0.06106	-0.01291	0.1113	0.06101	0.00722	0.12966	0.15002	0.14559
	0.3266	0.8391	<.0001		0.9462	0.5336	<.0001	0.0003	0.4493	<.0001	0.0003	0.6722	<.0001	<.0001	<.0001
CTC	0.10813	0.06863	0.40865	-0.00115	1	-0.07512	0.15595	0.00939	-0.01411	0.06244	0.0511	0.03961	0.05849	0.06709	0.05952
	<.0001	<.0001	<.0001	0.9462		<.0001	<.0001	0.582	0.4082	0.0002	0.0027	0.0202	0.0006	<.0001	0.0005
PLG	-0.261	-0.26299	0.03378	-0.01062	-0.07512	1	0.19028	0.18457	0.03405	-0.09981	-0.12922	-0.02739	-0.1472	-0.1649	-0.12777
	<.0001	<.0001	0.0477	0.5336	<.0001		<.0001	<.0001	0.046	<.0001	<.0001	0.1084	<.0001	<.0001	<.0001
SIZE	-0.1471	-0.17697	0.31887	0.34877	0.15595	0.19028	1	0.17306	-0.02898	0.00887	0.05415	0.08635	0.0556	0.00387	-0.00559
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001		<.0001	0.0895	0.6034	0.0015	<.0001	0.0011	0.8207	0.7432
LEV	-0.04621	-0.03679	-0.0133	-0.06106	0.00939	0.18457	0.17306	1	0.05862	-0.37422	-0.092	0.06929	-0.4087	-0.23762	-0.2482
	0.0067	0.031	0.4357	0.0003	0.582	<.0001	<.0001		0.0006	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
RET	-0.01125	-0.01464	-0.01723	-0.01291	-0.01411	0.03405	-0.02898	0.05862	1	-0.08333	-0.03016	0.00828	-0.09501	-0.0197	-0.02516
	0.5097	0.3911	0.3126	0.4493	0.4082	0.046	0.0895	0.0006		<.0001	0.0771	0.6275	<.0001	0.2483	0.1403
FCF	0.14198	0.14495	0.11057	0.1113	0.06244	-0.09981	0.00887	-0.37422	-0.08333	1	0.25104	0.05358	0.81172	0.33115	0.35022
	<.0001	<.0001	<.0001	<.0001	0.0002	<.0001	0.6034	<.0001	<.0001		<.0001	0.0017	<.0001	<.0001	<.0001

	INDN	INDR	BLK	FBL	CTC	PLG	SIZE	LEV	RET	FCF	BNS	G	ROA	Q	ADJQ
BNS	0.16024	0.16374	0.07622	0.06101	0.0511	-0.12922	0.05415	-0.092	-0.03016	0.25104	1	0.09646	0.35103	0.45073	0.43842
	<.0001	<.0001	<.0001	0.0003	0.0027	<.0001	0.0015	<.0001	0.0771	<.0001		<.0001	<.0001	<.0001	<.0001
G	0.0214	0.01866	0.06722	0.00722	0.03961	-0.02739	0.08635	0.06929	0.00828	0.05358	0.09646	1	0.13179	0.07891	0.0835
	0.2099	0.2741	<.0001	0.6722	0.0202	0.1084	<.0001	<.0001	0.6275	0.0017	<.0001		<.0001	<.0001	<.0001
ROA	0.17389	0.17318	0.1748	0.12966	0.05849	-0.1472	0.0556	-0.4087	-0.09501	0.81172	0.35103	0.13179	1	0.4138	0.44
	<.0001	<.0001	<.0001	<.0001	0.0006	<.0001	0.0011	<.0001	<.0001	<.0001	<.0001	<.0001		<.0001	<.0001
Q	0.21395	0.21529	0.13214	0.15002	0.06709	-0.1649	0.00387	-0.23762	-0.0197	0.33115	0.45073	0.07891	0.4138	1	0.97644
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.8207	<.0001	0.2483	<.0001	<.0001	<.0001	<.0001		<.0001
ADJQ	0.15416	0.15561	0.14655	0.14559	0.05952	-0.12777	-0.00559	-0.2482	-0.02516	0.35022	0.43842	0.0835	0.44	0.97644	1
	<.0001	<.0001	<.0001	<.0001	0.0005	<.0001	0.7432	<.0001	0.1403	<.0001	<.0001	<.0001	<.0001	<.0001	
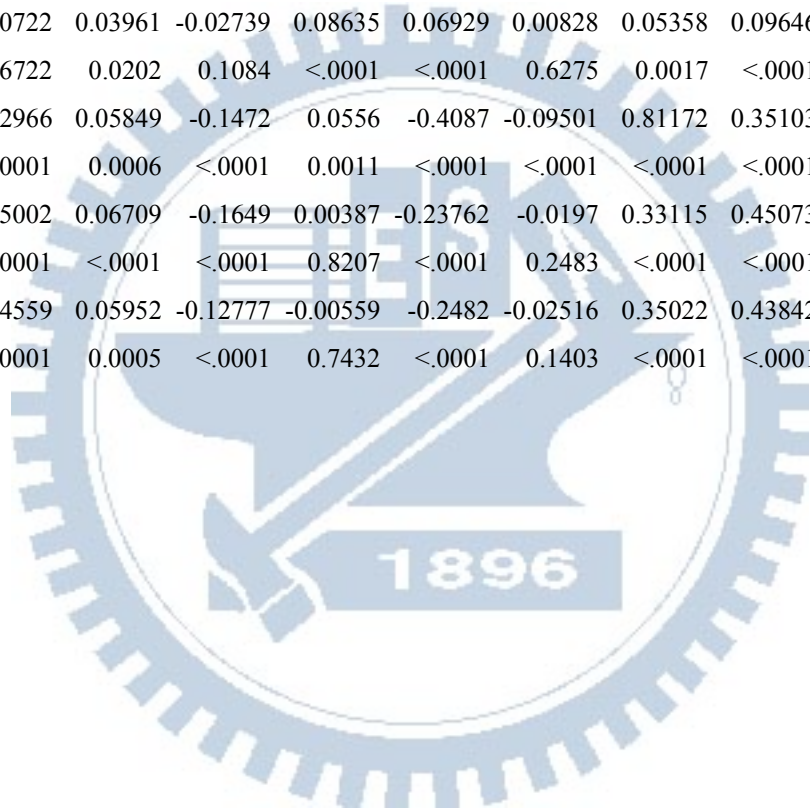
Table 6 preliminary regression analysis results

The table reports the estimates of coefficients of the preliminary regressions: equation (1) and equation (2). The sample consists of 3436 public-listed firm data from 2002 to 2006. The dependent variable is Tobin's Q. Variable definitions are in Table 1. In parentheses are p-value and significance at 10 percent, 5 percent and 1 percent is indicated by *, **, and ***, respectively.

Variable	(1A)	(1B)	(1C)	(1D)	(1E)	(2)
Intercept	9.48046	4.47635	8.0946	12.79928	8.45278	-0.43987
	***(<.0001)	***(0.0064)	***(<.0001)	***(<.0001)	*(0.0849)	(0.9361)
DIND	5.83749					5.09659
	***(0.0056)					**(0.0158)
DBLK		5.56445				4.48059
		***(<.0001)				***(<.0001)
DFB			12.58297			9.63896
			***(<.0001)			***(<.0001)
DCTC				-0.70788		0.32652
				(0.4394)		(0.7261)
DPLG					3.31185	1.2479
					(0.5083)	(0.8038)
SIZE	-0.79256	-2.56133	-2.89367	-1.31252	-1.18351	-3.16944
	(0.3102)	***(0.0014)	***(0.0004)	*(0.0922)	(0.1235)	***(0.0002)
LEV	-0.44077	-0.42397	-0.39476	-0.42591	-0.42266	-0.40967
	***(<.0001)	***(<.0001)	***(<.0001)	***(<.0001)	***(<.0001)	***(<.0001)
RET	0.0094	0.00903	0.00848	0.00931	0.0094	0.00862
	(0.2393)	(0.2566)	(0.287)	(0.2444)	(0.2404)	(0.278)
FCF	0.01097	0.0445	0.00627	0.00503	0.01339	0.04145
	(0.944)	(0.7752)	(0.9679)	(0.9743)	(0.9318)	(0.7901)
BNS	1.62215	1.64282	1.63582	1.64342	1.64512	1.61433
	***(<.0001)	***(<.0001)	***(<.0001)	***(<.0001)	***(<.0001)	***(<.0001)
G	0.02075	0.0194	0.0223	0.02047	0.02022	0.02118
	(0.1063)	(0.1297)	*(0.0817)	(0.1114)	(0.1161)	*(0.0974)
ROA	1.9319	1.86937	1.97432	1.99211	1.98185	1.82843
	***(<.0001)	***(<.0001)	***(<.0001)	***(<.0001)	***(<.0001)	***(<.0001)
N	3436	3436	3436	3436	3436	3436
Adj R-square	0.2955	0.3005	0.3004	0.2941	0.294	0.3047

Table 7 regression analysis of governance mechanism interaction test and firm characteristic dependence test

The table reports the estimates of coefficients of the governance mechanism interaction test in equation (8) and firm characteristic dependence test in equation (9) and (10). The sample consists of 3436 public-listed firm data from 2002 to 2006. The dependent variable is Tobin's Q. *MAXIB* denotes the substitutes effect of independent director and domestic blockholder, *MINIB* denotes the complementary effect of independent director and domestic blockholder, *MAXIF* denotes the substitution effect of independent director and foreign blockholder, *MINIF* denotes the complementary effect of independent director and foreign blockholder, *SMALL* denotes small firms, *LARGE* denotes large firms, *LOWGEAR* denotes low-leveraged firms, and *HIGHGEAR* denotes high-leveraged firms. Other variable definitions are in Table 1. In parentheses are p-value and significance at 10 percent, 5 percent and 1 percent is indicated by *, **, and ***, respectively.

| Variable	(8)	Variable	(9)	Variable	(10)
Intercept	3.81875 *(0.0553)	Intercept	3.99436 **(0.0435)	Intercept	3.76797 *(0.0519)
MAXIB	2.432 **(0.0327)	SMALL×MAXIB	2.42775 (0.1114)	LOWGEAR×MAXIB	1.4894 (0.4579)
MINIB	0.37409 (0.799)	SMALL×MAXIF	-0.41556 (0.7605)	LOWGEAR×MAXIF	7.65577 (0.5001)
MAXIF	1.19915 (0.1693)	SMALL×MINIB	2.60943 (0.213)	LOWGEAR×MINIB	4.75872 (0.1166)
MINIF	3.25635 ***(0.0091)	SMALL×MINIF	4.38671 **(0.0153)	LOWGEAR×MINIF	9.34561 ***(0.0003)
		LARGE×MAXIB	4.42212 ***(0.0002)	HIGHGEAR×MAXIB	2.59185 **(0.0282)
		LARGE×MINIF	2.42652 *(0.0862)	HIGHGEAR×MAXIF	-0.72889 (0.443)
SIZE	-1.62346 **(0.0357)	SIZE	-2.29402 **(0.0254)	SIZE	-1.41128 *(0.0636)
LEV	-0.43115 ***(<.0001)	LEV	-0.43804 ***(<.0001)	LEV	-0.098 (0.2478)
RET	0.00913 (0.2516)	RET	0.00936 (0.2402)	RET	0.00784 (0.3178)
FCF	0.01509 (0.9228)	FCF	0.02227 (0.8864)	FCF	-0.13301 (0.3885)
BNS	1.59894 ***(<.0001)	BNS	1.60208 ***(<.0001)	BNS	1.61627 ***(<.0001)
G	0.02123 *(0.0974)	G	0.0208 (0.1042)	G	0.02125 *(0.0923)
ROA	1.85301 ***(<.0001)	ROA	1.84417 ***(<.0001)	ROA	1.96844 ***(<.0001)
N	3436	N	3436	N	3436
Adj R^2	0.3013	Adj R^2	0.3012	Adj R^2	0.321

Table 8 robust Test

The table reports the robust test of the governance mechanism interaction test in equation (8) and firm characteristic dependence test in equation (9) and (10) by incrementally controlling for board size (*BRD*). The sample consists of 3436 public-listed firm data from 2002 to 2006. The dependent variable is Tobin's Q. *MAXIB* denotes the substitutes effect of independent director and domestic blockholder, *MINIB* denotes the complementary effect of independent director and domestic blockholder, *MAXIF* denotes the substitution effect of independent director and foreign blockholder, *MINIF* denotes the complementary effect of independent director and foreign blockholder, *SMALL* denotes small firms, *LARGE* denotes large firms, *LOWGEAR* denotes low-leveraged firms, and *HIGHGEAR* denotes high-leveraged firms. Other variable definitions are in Table 1. In parentheses are p-value and significance at 10 percent, 5 percent and 1 percent is indicated by *, **, and ***, respectively.

| Variable	Model B	Variable	Model C	Variable	Model D
Intercept	7.77192 **(0.0385)	Intercept	7.9732 **(0.0334)	Intercept	7.49704 **(0.0422)
MAXIB	2.61066 **(0.0229)	*SMALL×MAXIB*	2.63473 *(0.0859)	*LOWGEAR×MAXIB*	1.69619 (0.3996)
MINIB	0.41031 (0.7801)	*SMALL×MAXIF*	-0.43747 (0.7483)	*LOWGEAR×MAXIF*	7.58708 (0.5012)
MAXIF	1.17891 (0.1766)	*SMALL×MINIB*	2.64202 (0.2073)	*LOWGEAR×MINIB*	4.87431 (0.1081)
MINIF	3.20451 **(0.0103)	*SMALL×MINIF*	4.37931 **(0.0154)	*LOWGEAR×MINIF*	9.24173 ***(0.0003)
		LARGE×MAXIB	4.55975 ***(0.0001)	*HIGHGEAR×MAXIB*	2.74783 **(0.0207)
		LARGE×MINIF	2.37328 *(0.0934)	*HIGHGEAR×MAXIF*	-0.73453 (0.4395)
SIZE	-1.38682 *(0.0815)	*SIZE*	-2.02009 *(0.0542)	*SIZE*	-1.18889 (0.1291)
LEV	-0.43648 ***(<.0001)	*LEV*	-0.44325 ***(<.0001)	*LEV*	-0.10272 (0.2262)
RET	0.00921 (0.2473)	*RET*	0.00942 (0.2369)	*RET*	0.00792 (0.3132)
FCF	0.00962 (0.9508)	*FCF*	0.01667 (0.9149)	*FCF*	-0.13827 (0.3702)
BNS	1.59237 ***(<.0001)	*BNS*	1.59588 ***(<.0001)	*BNS*	1.60996 ***(<.0001)
G	0.02067 (0.1067)	*G*	0.02026 (0.1136)	*G*	0.02074 (0.1006)
ROA	1.86277 ***(<.0001)	*ROA*	1.85402 ***(<.0001)	*ROA*	1.97784 ***(<.0001)
BRD	-0.45529 (0.2142)	*BRD*	-0.45896 (0.2111)	*BRD*	-0.42946 (0.2349)
N	3436	N	3436	N	3436
Adj R²	0.3014	Adj R²	0.3014	Adj R²	0.3211

Figure 1 valuation effect of independent director

This figure reports the mean residual Tobin's Q for firms which have accommodated the new regulation of independent director (*DIND*=1) and firms have not accommodate (*DIND*=0). Residual Tobin's Q is derived from equation (3). The sample consists of 3436 public-listed firm data from 2002 to 2006.

Mean of residual Tobin's Q	-1.645475121	2.943690882
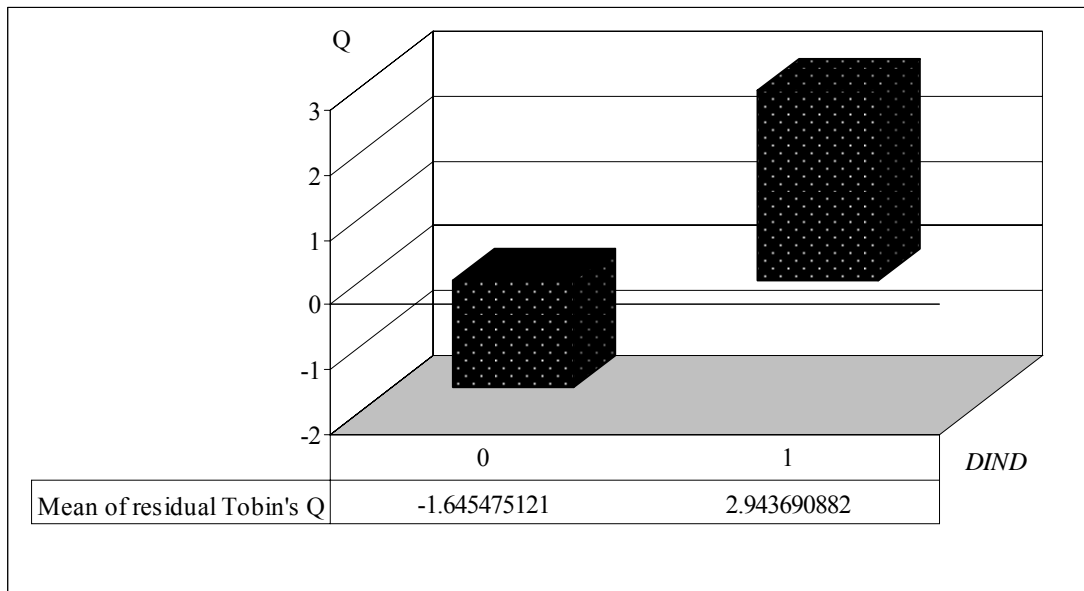
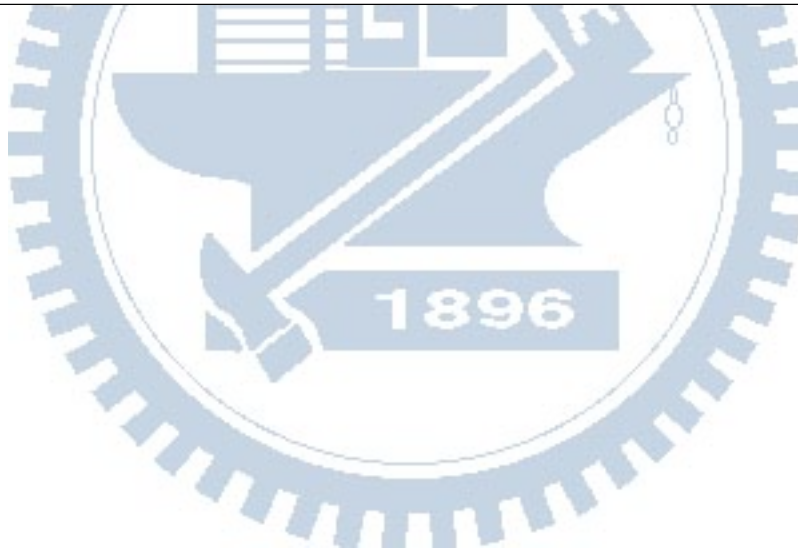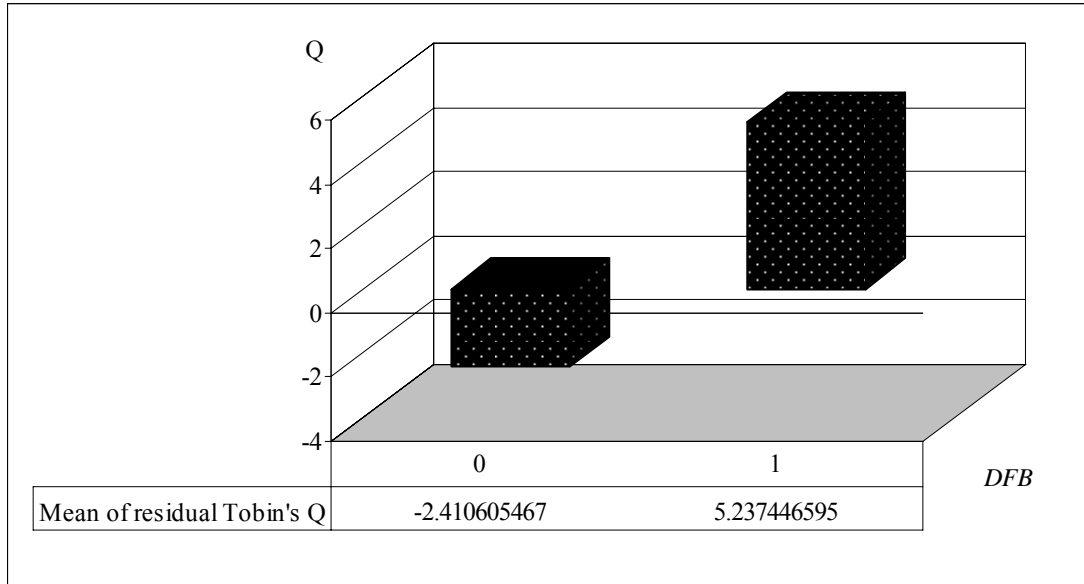## Figure 2 valuation effect of blockholder

This figure reports the mean residual Tobin's Q for firms with different level of percentage shareholding by domestic institutional investors (*DBLK*). Residual Tobin's Q is derived from equation (4). The sample consists of 3436 public-listed firm data from 2002 to 2006.

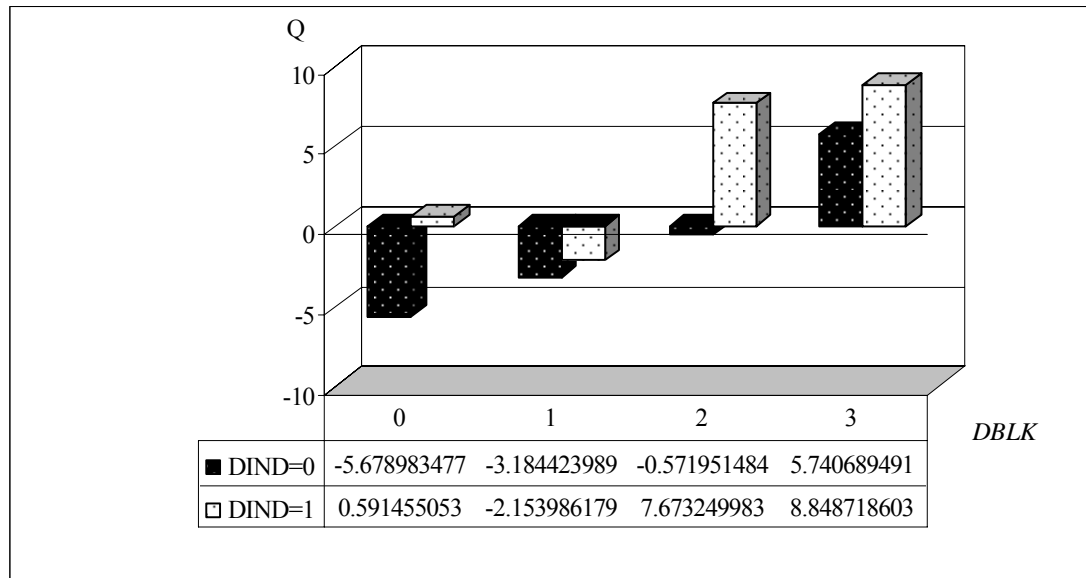|				
Mean of residual Tobin's Q	-3.45384531	-2.95080581	2.312459088	6.823928413
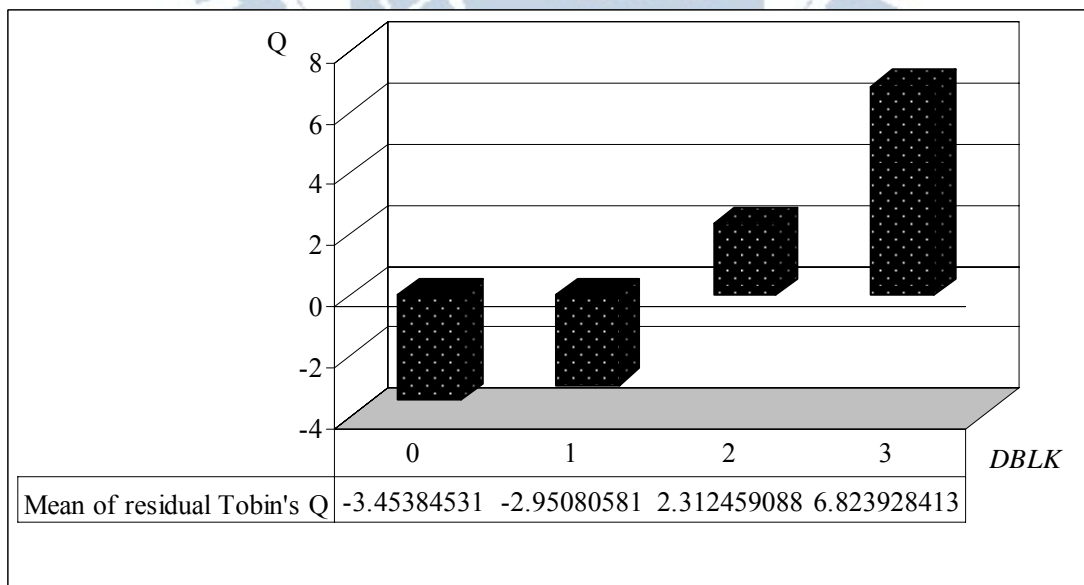
Figure 3 valuation effect of foreign blockholder

This figure reports the mean residual Tobin's Q for firms with lower or higher than 5 percent of share hold by foreign institutional investors (*DFB* equals to 0 or 1 respectively). Residual Tobin's Q is derived from equation (5). The sample consists of 3436 public-listed firm data from 2002 to 2006.

|	0	1	
			DFB
Mean of residual Tobin's Q	-2.410605467	5.237446595	

Figure 4 conditional valuation effect of independent director and blockholder

This figure reports the conditional mean residual Tobin's Q for firms with different level of board independence and domestic blockholder. Residual Tobin's Q is derived from equation (6). For instance, the left pillar represents firms with lowest domestic blockholder and weak board independence. The sample consists of 3436 public-listed firm data from 2002 to 2006.

	0	1	2	3
■ DIND=0	-5.678983477	-3.184423989	-0.571951484	5.740689491
□ DIND=1	0.591455053	-2.153986179	7.673249983	8.848718603

Figure 5 conditional valuation effect of independent director and foreign blockholder

This figure reports the conditional mean residual Tobin's Q for firms with different level of board independence and foreign blockholder. Residual Tobin's Q is derived from equation (7). For instance, the left pillar represents firms with lowest foreign blockholder and weak board independence. The sample consists of 3436 public-listed firm data from 2002 to 2006.

	0	1
■ DIND=0	-3.870629684	2.79777554
□ DIND=1	0.022796335	10.00959503
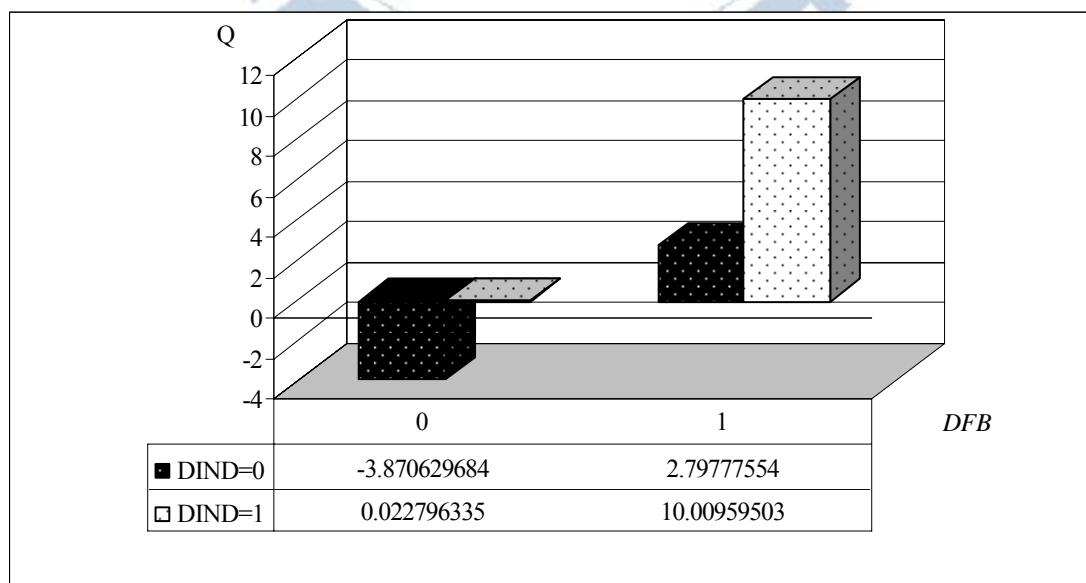
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