CORPORATE GOVERNANCE: BOARD CO-OPTION

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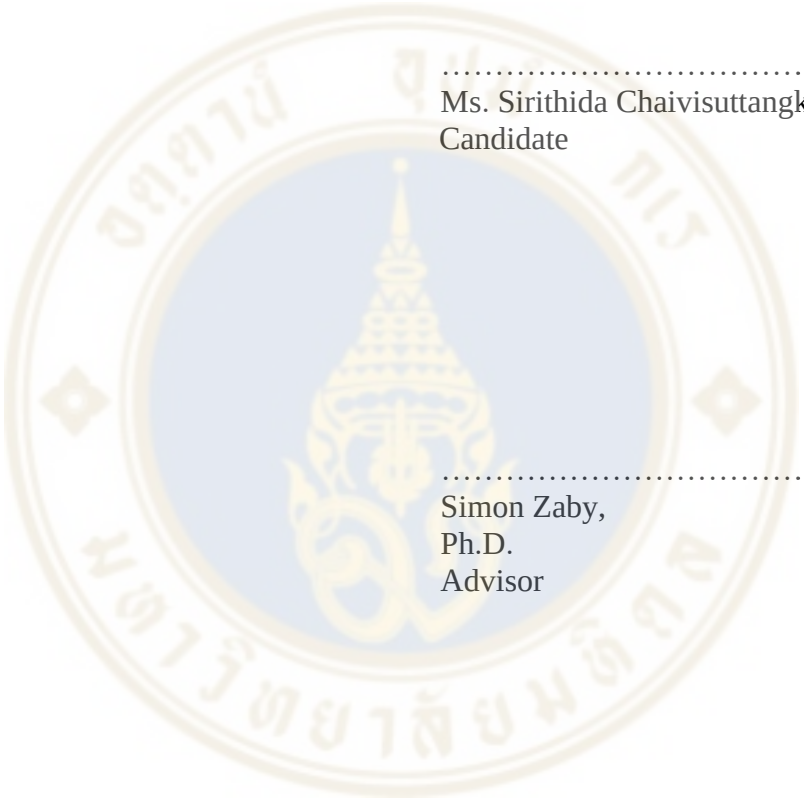

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ABSTRACT

This dissertation aims to examine the quality of board monitoring using a new measure, board co-option, in regard to how it works as a corporate governance mechanism in relating with other governance attributes and in affecting on different corporate outcomes, especially during the time of financial crisis. The dissertation extends the study of board co-option in three topics.

First, the effect of board co-option on firm risk. Firms with more co-opted directors experience significantly lower firm risk during the crisis. The results hold for total risk, idiosyncratic risk, and systematic risk. This corroborates the notion that, managers are inherently risk-averse, particularly so during the crisis. Co-opted directors allow managers to adopt corporate policies that reflect their own risk preferences, resulting in lower firm risk.

Second, the impact of co-option on firm value. Using Tobin's Q and Peters and Taylor's (1997) Q, the results show that board with more co-opted directors are beneficial to firm value outside the financial crisis. Specifically, a rise in tenure co-opted directors would have improved firm value by 4.85%. During the crisis, however, the effect of co-option is harmful to firm value.

Third, the trade-offs between co-option and other governance mechanisms. In particular, we investigate whether board co-option which constitute a weakened mechanism can be substituted by managerial ownership and the external monitoring provided by analyst coverage. The results show that board co-option which constitutes a weakened mechanism can be substituted by managerial ownership. In addition, the efficient board monitoring and the trade-off effects become less necessary in the highly regulated firms.

KEY WORDS: Co-option / Co-opted directors / Board co-option / Corporate Governance / Financial crisis

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CHAPTER I
INTRODUCTION

1.1 Overview

The purpose of this research is to examine the effectiveness of board monitoring using a new measure, board co-option, in regard to how it works as a corporate governance mechanism in associating with other governance attributes and in affecting on different corporate outcomes. Grounded in agency theory, the modern corporation characterized by the separation between ownership and control, creates conflicts of interest between managers and shareholders known as the principal-agent problem or agency problem (Berle and Means, 1932; Fama, 1980; Jensen and Meckling, 1976). With the presence of information asymmetry, the conflicts of interests can lead to managerial misbehaviors1 and agency costs, hence resulting in negative impact to firm value. An extensive body of research has attempted to determine the means to reduce the agency cost with the expected result in firm value enhancing. Such the agency costs can be mitigated through the use of several internal and external corporate governance mechanisms (Fama and Jensen, 1983 and Hart, 1995).

Amongst governance mechanisms, the internal governance mechanism performed by the board of directors, has been the focused attention in prior research and considered as the paramount governance mechanism. A tremendous volume of research has been conducted to examine the effectiveness of board monitoring in various aspects2 with their impact on firm value and other corporate outcomes. The traditional aspects of effective board monitoring commonly discussed are the independent and outside board of directors in relating to firm performance. However, the empirical

[1] The forms of mis-behaviors are explained for example by Berle and Means (1932) shifting profit from one company to another in which the manager has more interest; by Hart (1995) overpaying themselves, perquisites, power-enhancing investments, excessive risk-taking investments, and entrenchment; by Clark (1986) tunneling, incompetent management etc.

[2] Different aspects of effective board monitoring include board independent, board size, compositions and structure, meetings, CEO and chair duality (Yermack, 1996; Hermalin and Weisbach, 1998; Bhagat and Black, 1999; Vafeas, 1999; Anderson and Reeb, 2003; Coles, et al., 2008, 2011).

evidence yielded inconclusive results (Coles, Daniel, and Naveen, 2008; Adams, Hermalin, and Weisbach, 2010). Coles Daniel, and Naveen, (2014) suggested the reason for the vague and mixed results is because many directors on board are co-opted.

According to Coles et al., (2014), the terms "co-opted" directors or "board co-option" are introduced and defined as the one appointed to the board after the CEO took office. Since the CEO initially involves in director appointments, these directors owe their loyalty to the CEO and are more likely to stay in favor of the CEO. As a result, the co-opted independent directors may not serve or behave as though they are legally independent in performing the role of monitoring management. Rather, co-opted board can facilitate more managerial discretion, behavioral latitude, and insulation of the CEO. Coles et al., (2014) provide the evidence supporting their arguments on the weak monitoring by co-opted boards that there are less CEO turnovers, high CEO compensations, and more sub-optimal investments with board co-option. Moreover, their findings also suggest that the board independence, which has been the traditional board monitoring, has less explanatory power than the board co-option.

Along these lines, several recent literature has extended the notion of a new measure, board co-option. Withisuphakorn and Jiraporn (2017) explore the effect of co-opted directors on CEO power using CEO pay slice. They find that board co-option substitutes for strong CEO power. That is, as co-opted board imposes weaker monitoring, CEO can implement the policies he prefers without having so much power. Their finding is consistent with Coles et al. (2014) that the board co-option exhibits more explanatory than board independence. Moreover, Chintrakarn, Jiraporn, Sakr, and Lee (2016) examine the effect of co-opted directors in mitigating managerial myopia using a quasi-natural experiment through the passage of Sabanes-Oxley Act (SOX). They discover that board co-option decreases the probability of CEO removal, therefore managers are less likely to be fired and motivated to engage in the long-term investments rather than the short-term ones.

Additionally, there are ongoing research that also employ board co-option as a measure of ineffective governance mechanism. Jiraporn and Lee (2016) investigate the effect of co-opted board on corporate dividend payment policy. The results suggest that co-opted board represent a weakened mechanism that allows managers to retain more free cash flow within the firm, rather than pay it out as dividends. Consistently,

Jiraporn, Lee, and Kim (2017) study the influence of co-opted board on managerial risk-taking. The preliminary results demonstrate that corporate executives tend to take excessive risk due to the nature of the compensation that ties executive pay to firm performance, and the tendency is enhanced when the board of directors is co-opted.

1.2 Research Objectives

Motivated by prior literature on corporate governance in general and co-opted directors in particular along with its importance to managerial implications, this research extends the study of board co-option to the following topics:

1. How the board co-options influence managerial risk-taking decision? And whether the degree of the influence changes during the financial crisis?

2. How the board co-options as a corporate governance mechanism impact the firm value? And how does this mechanism work in the time of financial crisis?

3. Is board co-option associated with other governance mechanisms meant to reduce the agency problems? How the interrelationships between governance mechanisms work in different industries in which regulation is rigid?

The first two topics examine the effects of board co-option as a corporate governance mechanism on two corporate outcomes, i.e. managerial risk-taking and firm value. Following the findings of Coles et al. (2014) that co-opted board is a better measure to reflect board quality and has more explanatory power than board independence, thus it constituents a weakened mechanism and imposes less stringent oversight. In light of this notion, it is interesting and crucial to understand this aspect of board quality, besides independence, as to how it works as a governance mechanism in reducing agency costs and its implication to managerial risk-taking decision and firm value. It is undeniable that board of directors is crucially important because its function as the paramount governance mechanism in the firm, especially in the time of crisis. Jiraporn (2017) and Jenwittayaroje (2019) show that the effect of corporate governance may be different and more pronounce particularly during financial crisis as the crisis may exacerbate managerial entrenchment and expropriation. Therefore, this research further examines how the effects of board co-option during financial crisis 2008-2009 are different from that in normal times.

Furthermore, this study adopts the financial crisis as an exogenous economic shock because it is unexpected and can disrupt the equilibrium between board co-option and the corporate outcomes. Therefore, it is unlikely to argue that the firms adopted board co-option before the financial crisis that would be optimal during the crisis. The results of the study can reveal a causal relationship as board co-option and the corporate outcomes are out of equilibrium during the crisis. A number of studies have similarly employed the financial crisis as the exogenous shock to disrupt the equilibrium relationship (Lins, Servaes, and Tamayo, 2017; Amiraslani, Lins, Servaes, and Tamayo, 2017; Chintrakarn and Jiraporn, 2017).

The last topic explores the other governance mechanisms how they are associated with co-option in alleviating the agency problems. A number of empirical evidences suggest that studies focusing on a particular or a certain group of mechanisms ignore the interdependence between them (Rediker and Seth, 1995; Agrawal and Knoeber, 1996). Motivated by this argument and complementary with the notion of co-option, this topic is developed to examine the substitutability of different corporate governance mechanisms for the weakened board monitoring represented by co-opted board. The key governance mechanisms in this study are managerial ownership and analyst coverage. However, the costs and benefits of governance mechanisms can vary across industries and the substitution effects would also vary as a result. The financial industry is considered the most different from other industries due to its nature of business and strictly regulated environment. It is therefore another subject of analysis in this study to see how the interrelationships between governance mechanisms are different with the presence of regulations.

The dissertation proceeds as follows. Chapter II investigates the effect of board co-option on risk-taking during the crisis. Chapter III examines whether the firm value is impacted by the influence of having board co-option inside and outside the crisis. Chapter IV examines the tradeoff between board co-option and alternative governance mechanisms, particularly managerial ownership and analyst coverage.

CHAPTER II
THE EFFECT OF CO-OPTED DIRECTORS ON FIRM RISK DURING A STRESSFUL TIME: EVIDENCE FROM THE FINANCIAL CRISIS

2.1 Introduction

One crucial and traditional measure of board quality is board independence, i.e. the proportion of independent directors on the board. Recently, however, the literature has explored the role of an alternative measure of board quality, i.e. board co-option (Coles, Daniel, and Naveen, 2014, Jiraporn and Kim, 2018; Chintrakarn, Jiraporn, Sakr, and Lee, 2016). Co-opted directors are those appointed after the incumbent CEO assume office. They may be more inclined to assign their allegiance to the CEO for the CEO played a role in their appointment. Consistent with this notion, recent research shows that co-opted directors affect the quality of board monitoring and influence several vital corporate policies and outcomes. For instance, board co-option decreases CEO turnover-performance sensitivity, increases executive pay without a commensurate increase in pay-performance sensitivity (Coles, Daniel, and Naveen, 2014). Likewise, Jiraporn and Lee (2018) shows that co-opted directors allow managers to pay lower dividends, thereby keeping more cash within the firm, which could be exploited by opportunistic managers. Moreover, co-opted directors have been found to reduce the likelihood of adopting clawback provisions (Huang, Lim, and Ng, 2009), as well as increase the degree of default risk (Baghdadi, Nguyen, and, Podolski, 2019). Finally, Harris, Glegg, and Buckley (2019) report that co-opted directors enable manager to over-invest in inefficient R&D projects, thereby diminishing R&D output.

We contribute to this fledging, albeit rapidly growing, area of the literature by investigating the role of co-opted directors during the financial crisis of 2008. We focus on this crisis because it was the most recent and the most devastating in the past several decades. Theory suggests that, because managers are more exposed to the idiosyncratic risk, they develop strong risk aversion (Fama, 1980; Amihud and Lev,

1981; Smith and Stulz, 1985; Williams, 1987; Holmstrom, 1999; Gormley and Matsa, 2016). Managers are allowed to exercise their discretion to change firm risk via the selection of investment projects. Managers are able to reduce firm risk by adopting projects with lower cash flow volatility or investing in assets that make the firm's income stream more stable, such as diversification activities. Unlike well-diversified shareholders, who would rather adopt all positive net present value (NPV) projects, irrespective of project risk, managers may reject positive-NPV projects that are risky if they deem the cost of the increased risk unacceptable (Low, 2009). They are likely to avoid risk to protect their firm-specific human capital (Amihud and Lev, 1981; Smith and Stulz, 1985) and their perquisite consumption (Willams, 1987).

Consistent with this argument, Gormley and Matsa (2016) find that, after managers are insulated by the adoption of an anti-takeover law, they adopt value-reducing actions that diminish their firms' stock volatility and distress risk. Likewise, Panousi and Papanikolaou (2012) argue that managers are risk averse and may under-invest when firm specific uncertainty is high, leading to sub-optimal investment decisions from the perspective of well-diversified shareholders. They find empirical evidence consistent with this argument. This managerial risk version is expected to be particularly more pronounced during a stressful time as the firm navigates a crisis. Because co-opted directors allow managers to adopt corporate policies that reflect the managers' own risk aversion, we argue that co-opted directors reduce firm risk during the financial crisis.

Based on a large sample of over 11,000 observations, our results show that firms where more directors are co-opted exhibit significantly lower risk during the financial crisis. Consistent with our argument, board co-option leads to lower risk during a stressful time. We confirm the results using two alternative measures of co-opted directors and three alternative measures of firm risk. All the results are consistent and appear to be robust. Furthermore, our results are not only statistically significant, but are also economically meaningful. In terms of economic significance, we estimate that a rise in co-opted directors by one standard deviation lowers total risk, idiosyncratic risk, and systematic risk by 16.11%, 8.80%, and 22.60% respectively. To minimize endogeneity, we execute fixed- and random-effects regressions and an instrumental-variable analysis and obtain consistent results. Moreover, we implement propensity

score matching, where we match firms with high board co-option during the crisis with control firms with similar characteristics. Our propensity score matching analysis produces consistent results. It is unlikely that our conclusion is driven by endogeneity.

2.2 Sample and data description

2.2.1 Sample construction

The director data are from RiskMetrics. Co-opted directors are defined as those appointed after the incumbent CEO assumes office. We define and calculate the percentage of co-opted directors in the same way as Coles, Daniel, and Naveen (2014). Firm characteristics are from COMPUSTAT. The final sample consists of 11,741 firm-year observations from 1996 to 2010.

2.2.2 Variable description and model specifications

Following Coles, Daniel, and Naveen (2014), we adopt two definitions of co-option. The first definition is a simple measure, i.e. the percentage of directors appointed after the current CEO assumes office. The second definition is more sophisticated, i.e. tenure-weight co-option (TW co-option). Out of concern that co-opted directors may become even more co-opted through time and that the influence of co-opted directors increases with their tenure on the board, Coles, Daniel, and Naveen (2014) calculate TW co-option as the sum of the tenure of co-opted directors divided by the total tenure of all directors, so an increase likely indicates stronger co-option. We use both measures of co-option in our empirical analysis.

We measure the extent of firm risk in three different ways. First, we compute the standard deviation of daily stock returns in each year and use this variable as a proxy for total risk. Second, we regress daily stock returns on daily market returns. Then, we calculate the standard deviation of the residuals from the regression. This variable represents the idiosyncratic risk as the effect of the broad market risk has been removed. Third, we measure systematic risk by using the coefficient of the market return when daily returns are regressed on market returns. The coefficient represents the extent to which the firm's stock returns change in response to changes in market returns.

The Great Recession took place between 2008 and 2009. So, we construct a binary variable equal to one for 2008 and 2009 and zero otherwise (Lins, Servaes, and Tamayo, 2017; Amiraslani, Lins, Servaes, and Tamayo, 2017; Jenwittayaroje and Jiraporn, 2018; Withisuphakorn and Jiraporn, 2018). This dichotomous variable is labelled "Crisis". We also create an interaction term between board co-option and Crisis. Our focus is on the coefficient of the interaction term, which reveals the effect of board co-option on firm risk during the financial crisis. Essentially, we estimate the following model.

$$Firm\ Risk = a + b(Crisis) + c(Board\ Co\text{-}option) + d(Crisis \times Board\ Co\text{-}option) + Controls$$

Based on the literature, we include a large number of control variables. For firm-specific characteristics, we include firm size (log of total assets), leverage (total debt/total assets), profitability (EBIT/total assets), investments (capital expenditures/total assets), advertising (advertising expense/total assets), R&D (R&D spending/total assets), dividend payouts (dividends/total assets). In addition, we control for two traditional measure of board effectiveness, i.e. board independence and board size Board independence is the percentage of independent directors on the board. To account for managers' incentives for risk-taking, we include delta and vega.[1] Finally, to control for any unobservable characteristics that remain constant through time, we include firm fixed effects in most specifications. Table 2.1 shows the descriptive statistics for our risk measures, co-option measures, and board and firm characteristics.

Following Coles, Daniel, and Naveen (2014), we adopt two definitions of co-option. The first definition is a simple measure, i.e. the percentage of directors appointed after the current CEO assumes office. The second definition is more sophisticated, i.e. tenure-weight co-option (TW co-option). Out of concern that co-opted directors may become even more co-opted through time and that the influence of co-opted directors increases with their tenure on the board, Coles, Daniel, and Naveen (2014) calculate TW co-option as the sum of the tenure of co-opted directors divided by the total tenure of all directors, so an increase likely indicates stronger co-option. We measure the extent of corporate risk-taking in three different ways. First, we compute

[1] Delta is the dollar change in the executive's wealth for a 1% change in stock returns. Vega is the dollar change in the executive's wealth for a 1% change in the standard deviation of stock returns.

the standard deviation of daily stock returns in each year and use this variable as a proxy for total risk. Second, we regress daily stock returns on daily market returns. Then, we calculate the standard deviation of the residuals from the regression. This variable represents the idiosyncratic risk as the effect of the broad market risk has been removed. Third, we measure systematic risk by using the coefficient of the market return when daily returns are regressed on market returns. The coefficient represents the extent to which the firm's stock returns change in response to changes in market returns. Delta is the dollar change in the executive's wealth for a 1% change in stock returns. Vega is the dollar change in the executive's wealth for a 1% change in the standard deviation of stock returns.

Table 2.1 Descriptive statistics

	Mean	Std. Dev.	Median	25th	75th
Risk Measures					
Total Risk	0.451	0.214	0.398	0.302	0.545
Idiosyncratic Risk	0.391	0.194	0.344	0.257	0.475
Systematic Risk	1.068	0.533	1.005	0.704	1.363
Co-option					
Co-option	0.475	0.319	0.444	0.200	0.750
Tenure-weighted Co-option	0.311	0.329	0.174	0.043	0.492
Board and Firm Characteristics					
Board Size	9.041	2.452	9.000	7.000	11.000
% Independent Directors	69.688	16.410	71.429	60.000	83.333
Total Assets	6866.537	27671.970	1431.856	562.053	4274.856
Total Debt/Total Assets	0.216	0.176	0.207	0.059	0.325
R&D/Total Assets	0.035	0.062	0.007	0.000	0.048
Advertising/Total Assets	0.013	0.034	0.000	0.000	0.009
EBIT/Total Assets	0.097	0.110	0.098	0.056	0.146
Capital Exp./Total Assets	0.057	0.054	0.041	0.023	0.072
Dividends/Total Assets	0.013	0.028	0.004	0.000	0.017
Delta	933.184	8225.206	242.792	97.331	623.752
Vega	152.926	303.977	65.000	25.922	159.698

2.3 Results

2.3.1 Main regression results

Table 2.2 shows the regression results. All the regressions in Table 2.2 include firm fixed effects. The dependent variable in Model 1 is total risk. The focus is on the interaction term, which produces a negative and significant coefficient. In Model 2, where the dependent variable is idiosyncratic risk, the coefficient of the interaction term is also significantly negative. Finally, in Model 3, where systematic risk is the dependent variable, the interaction term also carries a negative and significant coefficient. So, the results in all three models are similar, suggesting that firms with more co-opted directors experience significantly lower risk during the financial crisis. The empirical results reinforce our argument that, during a stressful time, managers are highly risk-averse and are able to lower firm risk significantly to reflect their own risk preferences when there are more co-opted directors on the board.[2]

Following Coles, Daniel, and Naveen (2014), we adopt two definitions of co-option. The first definition is a simple measure, i.e. the percentage of directors appointed after the current CEO assumes office. The second definition is more sophisticated, i.e. tenure-weight co-option (TW co-option). Out of concern that co-opted directors may become even more co-opted through time and that the influence of co-opted directors increases with their tenure on the board, Coles, Daniel, and Naveen (2014) calculate TW co-option as the sum of the tenure of co-opted directors divided by the total tenure of all directors, so an increase likely indicates stronger co-option. Crisis is a binary variable equal to one for 2008 and 2009, and zero otherwise. We measure the extent of corporate risk-taking in three different ways. First, we compute the standard deviation of daily stock returns in each year and use this variable as a proxy for total risk. Second, we regress daily stock returns on daily market returns. Then, we

[2] It can be argued that, during a crisis, it is desirable to reduce firm risk. To the extent that co-opted directors lead to lower firm risk during a crisis, this is not necessarily a bad outcome. A counter argument is that co-opted directors may enable managers to reduce firm risk to the point where shareholders' wealth is not maximized, even during a crisis. Chatjuthamard et al. (2020) find evidence consistent with the latter argument. Facing economic uncertainty, firms raise their executive risk-taking incentives, implying that, during a time of greater uncertainty, managers tend to be overly cautious, resulting in a sub-optimal degree of risk-taking. To counter this tendency for too little risk, firms increase their risk-taking incentives to motivate manager to take more risk.

calculate the standard deviation of the residuals from the regression. This variable represents the idiosyncratic risk as the effect of the broad market risk has been removed. Third, we measure systematic risk by using the coefficient of the market return when daily returns are regressed on market returns. The coefficient represents the extent to which the firm's stock returns change in response to changes in market returns. Delta is the dollar change in the executive's wealth for a 1% change in stock returns. Vega is the dollar change in the executive's wealth for a 1% change in the standard deviation of stock returns.

Table 2.2 The effect of co-opted directors on firm risk during the financial crisis

	(1)	(2)	(3)	(4)	(5)	(6)
	Total Risk	Idiosyncratic Risk	Systematic Risk	Total Risk	Idiosyncratic Risk	Systematic Risk
Crisis × Co-option	-0.034**	-0.027**	-0.142***			
	(-2.565)	(-2.221)	(-3.799)			
Co-option	0.026***	0.024***	0.014			
	(3.875)	(4.058)	(0.741)			
Crisis × TW Co-option				-0.042***	-0.030**	-0.151***
				(-3.220)	(-2.573)	(-4.138)
TW Co-option				0.041***	0.038***	0.006
				(5.634)	(5.731)	(0.292)
Crisis	0.238***	0.144***	0.046**	0.235***	0.140***	0.024
	(31.688)	(21.258)	(2.164)	(40.910)	(27.181)	(1.510)
Ln (Board Size)	-0.049***	-0.036***	-0.379***	-0.047***	-0.034***	-0.378***
	(-4.065)	(-3.336)	(-11.354)	(-3.920)	(-3.190)	(-11.336)
% Independent Directors	-0.001***	-0.001***	0.003***	-0.001***	-0.001***	0.003***
	(-7.377)	(-10.130)	(7.004)	(-7.284)	(-10.018)	(6.956)
Ln (Total Assets)	-0.078***	-0.089***	0.120***	-0.077***	-0.089***	0.120***
	(-19.793)	(-25.116)	(10.872)	(-19.673)	(-25.003)	(10.862)

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.2 The effect of co-opted directors on firm risk during the financial crisis (cont.)

	(1)	(2)	(3)	(4)	(5)	(6)
	Total Risk	Idiosyncratic Risk	Systematic Risk	Total Risk	Idiosyncratic Risk	Systematic Risk
Leverage	0.166***	0.178***	0.346***	0.164***	0.177***	0.345***
	(11.173)	(13.331)	(-8.323)	(11.064)	(13.225)	(-8.318)
R&D/Total Assets	-0.100*	-0.088*	-0.273*	-0.092	-0.081	-0.275*
	(-1.708)	(-1.667)	(-1.674)	(-1.573)	(-1.537)	(-1.683)
Advertising/Total Assets	0.006	-0.035	0.614*	0.018	-0.025	0.615*
	(0.057)	(-0.346)	(1.960)	(0.161)	(-0.245)	(1.960)
EBIT/Total Assets	-0.291***	-0.229***	-0.655***	-0.290***	-0.228***	-0.656***
	(-13.777)	(-12.013)	(-11.071)	(-13.734)	(-11.971)	(-11.086)
Capital Exp./Total Assets	0.277***	0.256***	-0.157	0.274***	0.254***	-0.153
	(6.049)	(6.215)	(-1.227)	(5.998)	(6.159)	(-1.194)
Dividends/Total Assets	-0.377***	-0.349***	-0.298*	-0.375***	-0.347***	-0.298*
	(-5.936)	(-6.104)	(-1.675)	(-5.906)	(-6.076)	(-1.679)
Ln (Delta)	-0.006***	-0.009***	0.083***	-0.007***	-0.010***	0.084***
	(-2.806)	(-4.771)	(13.611)	(-3.225)	(-5.182)	(13.725)
Ln (Vega)	-0.008***	-0.007***	0.052***	-0.007***	-0.006***	0.053***
	(-3.545)	(-3.242)	(-8.316)	(-3.312)	(-3.014)	(-8.343)
Constant	1.217***	1.246***	0.764***	1.210***	1.240***	0.766***
	(33.633)	(38.213)	(7.541)	(33.463)	(38.049)	(7.561)
Observations	11,741	11,741	11,741	11,741	11,741	11,741
Adjusted R-squared	0.582	0.587	0.473	0.583	0.588	0.473

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

It should be noted that the coefficients of *Crisis* by itself are all positive and significant in all three models. This makes a great deal of sense as firms experience

substantially higher risk during the crisis. To corroborate the results, we employ an alternative measure of board co-option, i.e. tenure-weighted co-option in Model 4 through Model 6. Again, the coefficients of all the interaction terms are negative and significant. Our results seem to be robust as we obtain consistent results using both measures of co-option and three different measures of firm risk. It is important to note that firm fixed-effects are included in all the regressions in Table 2.2. Our results are thus not driven by any unobservable characteristics that remain constant through time. Finally, we also perform a random-effects regression analysis as a robustness check and obtain similar results (results not shown).

2.3.2 Instrumental-variable analysis (IV)

To minimize endogeneity, we execute an instrumental-variable analysis. This approach alleviates the endogeneity biases that can be attributed to measurement errors, reverse causality, and unobserved heterogeneity. We employ as our instrument the degree of board co-option in the earliest year for each firm before the crisis. The degree of board co-option during the crisis could not have resulted from co-option before the crisis, thereby mitigating potential reverse causality. For each firm, we identify the earliest year the firm appears in the sample. We include only those firms where the earliest year precedes the crisis.

One possible criticism against this instrument is that board co-option may be sticky, changing only slowly over time. So, the value from the earliest year may not be so different from the value in any given year. To alleviate this concern, we calculate the standard deviation of board co-option in each firm through time and include only those firms where the standard deviation is above the median. The logic is that, by concentrating on those firms where board co-option changes relatively more rapidly, we mitigate the concern for board co-option changing slowly over time.

The results for the instrumental-variable analysis are shown in Table 2.3. Model 1 is the first-stage regression where board co-option is the dependent variable. As expected, the coefficient of board co-option in the earliest year is positive and highly significant. Model 2 is the second-stage regression where total risk is the dependent variable. We create an interaction term by multiplying Crisis by co-option instrumented from the first stage. The coefficient of the interaction term is negative and significant.

In Model 3 and Model 4, the dependent variables are idiosyncratic risk and systematic risk respectively. All the results are consistent, showing that co-opted directors lead to lower firm risk during the crisis. We replicate all the regressions using tenure-weighted co-option instead of simple co-option and obtain similar results (for brevity, the results are not shown but available upon request). The instrumental-variable approach is substantially less vulnerable to endogeneity. Therefore, our results are not likely driven by endogeneity.

Following Coles, Daniel, and Naveen (2014), we adopt two definitions of co-option. The first definition is a simple measure, i.e. the percentage of directors appointed after the current CEO assumes office. The second definition is more sophisticated, i.e. tenure-weight co-option (TW co-option). Out of concern that co-opted directors may become even more co-opted through time and that the influence of co-opted directors increases with their tenure on the board, Coles, Daniel, and Naveen (2014) calculate TW co-option as the sum of the tenure of co-opted directors divided by the total tenure of all directors, so an increase likely indicates stronger co-option. Crisis is a binary variable equal to one for 2008 and 2009, and zero otherwise. We measure the extent of corporate risk-taking in three different ways. First, we compute the standard deviation of daily stock returns in each year and use this variable as a proxy for total risk. Second, we regress daily stock returns on daily market returns. Then, we calculate the standard deviation of the residuals from the regression. This variable represents the idiosyncratic risk as the effect of the broad market risk has been removed. Third, we measure systematic risk by using the coefficient of the market return when daily returns are regressed on market returns. The coefficient represents the extent to which the firm's stock returns change in response to changes in market returns. Delta is the dollar change in the executive's wealth for a 1% change in stock returns. Vega is the dollar change in the executive's wealth for a 1% change in the standard deviation of stock returns.

Table 2.3 Instrumental-variable analysis using earliest co-option on firms with high variance in co-option

	(1)	(2)	(3)	(4)
	Co-option	Total Risk	Idiosyncratic Risk	Systematic Risk
Co-option (Earliest)	0.443***			
	(27.813)			
Crisis × Co-option (Instrumented)		-0.201***	-0.156***	-0.426***
		(-3.982)	(-3.785)	(-3.453)
Co-option (Instrumented)		0.013	0.008	0.080
		(0.519)	(0.342)	(0.942)
Crisis	0.008	0.297***	0.175***	0.266***
	(0.950)	(10.826)	(7.640)	(4.219)
Ln (Board Size)	-0.034	-0.087***	-0.063***	-0.483***
	(-1.634)	(-4.781)	(-3.778)	(-9.385)
% Independent Directors	0.001**	-0.002***	-0.002***	0.001*
	(2.125)	(-6.974)	(-8.264)	(1.943)
Ln (Total Assets)	-0.038***	-0.026***	-0.032***	0.035***
	(-8.548)	(-7.548)	(-10.036)	(3.029)
Leverage	0.088***	0.052**	0.073***	-0.342***
	(3.211)	(2.164)	(3.334)	(-4.283)
R&D/Total Assets	-0.164*	0.550***	0.510***	1.064***
	(-1.935)	(6.564)	(6.823)	(4.546)
Advertising/Total Assets	-0.292**	0.114	0.197**	-0.668***
	(-2.317)	(1.355)	(2.376)	(-2.777)
EBIT/Total Assets	-0.152***	-0.406***	-0.362***	-0.614***
	(-2.916)	(-8.052)	(-8.025)	(-5.022)
Capital Exp./Total Assets	0.033	0.195***	0.227***	-0.619***
	(0.446)	(3.401)	(4.139)	(-3.326)
Dividends/Total Assets	-0.270*	-0.578***	-0.521***	-1.194**
	(-1.828)	(-2.789)	(-2.814)	(-2.358)
Ln (Delta)	0.074***	-0.004	-0.007*	0.052***
	(15.485)	(-1.095)	(-1.816)	(4.039)
Ln (Vega)	-0.020***	-0.006*	-0.005	-0.041***
	(-4.019)	(-1.813)	(-1.556)	(-3.221)

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.3 Instrumental-variable analysis using earliest co-option on firms with high variance in co-option (cont.)

	(1)	(2)	(3)	(4)
	Co-option	Total Risk	Idiosyncratic Risk	Systematic Risk
Constant	0.257***	0.968***	0.913***	1.810***
	(5.391)	(23.220)	(23.637)	(13.981)
Observations	11,333	5,875	5,875	5,875
Adjusted R-squared	0.346	0.379	0.368	0.155

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In addition, we estimate the economic significance of our results as follows. In Table 2.3 Model 2, the coefficient of the interaction term is -0.201. One standard deviation of co-option is 0.319. Therefore, a rise in board co-option by one standard deviation diminishes firm risk during the crisis by 0.319×0.201 = 0.064. Because the median of total risk is 0.398, a drop in total risk by 0.064 represents a decrease by 16.11%. Applying similar calculations, we find that an increase in board co-option by one standard deviation decreases idiosyncratic risk and systematic risk during the crisis by 8.80% and 22.60%. Apparently, the effect of co-opted directors on firm risk during the crisis is not only statistically significant, but is also economically meaningful.[3,4]

2.3.3 Propensity score matching (PSM)

To further confirm the results, we employ propensity score matching. We divide the sample into four quartiles by board co-option. We then classify those in the

[3] The effect of co-opted directors on firm risk appears to be large. To put the magnitude of the effect in perspective, we compare our results with those in the literature. Prior research investigating the effect of board independence on firm risk finds that board independence reduces total risk and idiosyncratic risk by 24.87% and 12.86% respectively (Jiraporn and Lee, 2017). So, the magnitude of the effect of board governance on firm risk documented in this study, although seemingly large, is comparable to those in prior research.

[4] Co-option reduces the systematic risk more than the idiosyncratic risk. While we are not completely certain why this is the case, we can advance one conjecture. Normally, most of the firm's total risk can be attributed to the idiosyncratic risk. Nevertheless, during a crisis, this is not necessarily the case as a crisis severely devastates the entire economy. During a crisis, most of the total risk may be attributed to the systematic risk. This is why co-opted directors reduce the systematic risk more than the idiosyncratic risk. Admittedly, this is merely our conjecture. We encourage future research to explore this issue further.

top quartile (highest co-option) during the crisis period as our treatment group. For each firm in the treatment group, we identify a firm in the control group that is most similar using eleven board and firm characteristics (i.e. the eleven control variables in the regression analysis).

To verify that our PSM is successful, we run the following diagnostic tests. The results are shown in Table 2.4. Model 1 is a logistic regression predicting the probability of being included in the treatment group before PSM is executed (pre-match). Several coefficients in Model 1 are significant. The treatment firms appear to have larger board size, have smaller firm size, are more leveraged, are less profitable, have more capital investments, pay lower dividends, and have different incentives for managerial risk-taking. These differences may confound our analysis. Model 2 is a logistic regression after PSM is performed (post-match). None of the coefficients in Model 2 are significant. Our PSM appears to be successful. So, our treatment and control firms are nearly identical in all observable dimensions, except one, i.e. the degree of board co-option during the crisis. To the extent that board co-option does not matter, the treatment and the control firms should exhibit similar firm risk during the crisis.

Following Coles, Daniel, and Naveen (2014), we adopt two definitions of co-option. The first definition is a simple measure, i.e. the percentage of directors appointed after the current CEO assumes office. The second definition is more sophisticated, i.e. tenure-weight co-option (TW co-option). Out of concern that co-opted directors may become even more co-opted through time and that the influence of co-opted directors increases with their tenure on the board, Coles, Daniel, and Naveen (2014) calculate TW co-option as the sum of the tenure of co-opted directors divided by the total tenure of all directors, so an increase likely indicates stronger co-option. Crisis is a binary variable equal to one for 2008 and 2009, and zero otherwise. Delta is the dollar change in the executive's wealth for a 1% change in stock returns. Vega is the dollar change in the executive's wealth for a 1% change in the standard deviation of stock returns.

Table 2.4 Propensity score matching: Diagnostic tests

	Pre-Match	Post-Match
	(1)	(2)
	Treatment (High Co-option)	Treatment (High Co-option)
Crisis	0.051	0.079
	(1.178)	(1.232)
Ln (Board Size)	-0.424***	0.150
	(-3.081)	(0.964)
% Independent Directors	-0.001	0.001
	(-0.574)	(0.748)
Ln (Total Assets)	-0.182***	-0.004
	(-6.239)	(-0.123)
Leverage	0.429***	-0.046
	(2.768)	(-0.241)
R&D/Total Assets	-0.439	-0.012
	(-0.857)	(-0.021)
Advertising/Total Assets	-0.809	0.499
	(-1.047)	(0.499)
EBIT/Total Assets	-0.709***	0.086
	(-2.689)	(0.307)
Capital Exp./Total Assets	-0.911*	0.110
	(-1.934)	(0.189)
Dividends/Total Assets	-4.149***	-2.075
	(-2.866)	(-1.484)
Ln (Delta)	0.375***	0.008
	(13.394)	(0.230)
Ln (Vega)	-0.139***	-0.022
	(-5.100)	(-0.667)
Constant	0.186	-0.356
	(0.631)	(-1.010)
Observations	11,741	5,442

Robust z-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Using the PSM-matched sample, we execute an instrumental-variable analysis in Table 2.5. The coefficients of all the interaction terms are negative and significant. We replicate all the regressions using tenure-weighted co-option and obtain similar results (results not shown). Co-opted directors bring about lower firm risk during the financial crisis. Both PSM and IV estimates produce consistent results. Therefore, while it is impossible to rule out endogeneity entirely, our results are unlikely confounded by endogeneity.

Following Coles, Daniel, and Naveen (2014), we adopt two definitions of co-option. The first definition is a simple measure, i.e. the percentage of directors appointed after the current CEO assumes office. The second definition is more sophisticated, i.e. tenure-weight co-option (TW co-option). Out of concern that co-opted directors may become even more co-opted through time and that the influence of co-opted directors increases with their tenure on the board, Coles, Daniel, and Naveen (2014) calculate TW co-option as the sum of the tenure of co-opted directors divided by the total tenure of all directors, so an increase likely indicates stronger co-option. Crisis is a binary variable equal to one for 2008 and 2009, and zero otherwise. We measure the extent of corporate risk-taking in three different ways. First, we compute the standard deviation of daily stock returns in each year and use this variable as a proxy for total risk. Second, we regress daily stock returns on daily market returns. Then, we calculate the standard deviation of the residuals from the regression. This variable represents the idiosyncratic risk as the effect of the broad market risk has been removed. Third, we measure systematic risk by using the coefficient of the market return when daily returns are regressed on market returns. The coefficient represents the extent to which the firm's stock returns change in response to changes in market returns. Delta is the dollar change in the executive's wealth for a 1% change in stock returns. Vega is the dollar change in the executive's wealth for a 1% change in the standard deviation of stock returns.

Table 2.5 Instrumental-variable analysis with propensity score matching

	(1)	(2)	(3)
	Total Risk	Idiosyncratic Risk	Systematic Risk
Crisis × Co-option (Instrumented)	-0.165**	-0.150**	-0.298*
	(-2.144)	(-2.336)	(-1.657)
Crisis	0.269***	0.163***	0.159
	(6.464)	(4.553)	(1.600)
Co-option (Instrumented)	0.034	0.031	0.021
	(0.883)	(0.908)	(0.169)
Ln (Board Size)	-0.110***	-0.083***	-0.522***
	(-4.071)	(-3.511)	(-6.977)
% Independent Directors	-0.002***	-0.002***	0.001
	(-5.467)	(-6.335)	(0.828)
Ln (Total Assets)	-0.021***	-0.029***	0.060***
	(-3.650)	(-5.885)	(3.509)
Leverage	-0.013	0.015	-0.457***
	(-0.386)	(0.490)	(-3.964)
R&D/Total Assets	0.542***	0.480***	1.270***
	(3.753)	(3.806)	(3.593)
Advertising/Total Assets	-0.038	0.063	-0.729**
	(-0.312)	(0.550)	(-2.058)
EBIT/Total Assets	-0.358***	-0.305***	-0.620***
	(-5.317)	(-5.063)	(-4.691)
Capital Exp./Total Assets	0.114	0.164**	-0.553**
	(1.387)	(2.203)	(-2.017)
Dividends/Total Assets	-1.407***	-1.238***	-3.232***
	(-4.846)	(-4.940)	(-4.015)
Ln (Delta)	-0.010	-0.011**	0.033**
	(-1.647)	(-2.168)	(2.068)
Ln (Vega)	0.001	0.001	-0.004
	(0.181)	(0.131)	(-0.219)
Constant	1.027***	0.974***	1.792***
	(15.535)	(16.696)	(9.240)

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.5 Instrumental-variable analysis with propensity score matching (cont.)

	(1)	(2)	(3)
	Total Risk	Idiosyncratic Risk	Systematic Risk
Observations	2,636	2,636	2,636
R-squared	0.346	0.356	0.187

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

2.4 Conclusions

We contribute to the recent literature that explores the role of co-opted directors (Coles, Daniel, and Naveen, 2014, Jiraporn and Kim, 2018; Chintrakarn, Jiraporn, Sakr, and Lee, 2016). In particular, we study the effect of co-opted directors on firm risk during the financial crisis of 2008. We posit that, during the crisis, managers tend to be highly risk-averse. Co-opted directors allow managers to adopt corporate policies that reflect their own risk preferences. Consistent with this notion, our results show that firms with more co-opted directors exhibit significantly lower firm risk during crisis. We obtain consistent results using two alternative measures of co-opted directors and three alternative measures of firm risk. To minimize endogeneity, we execute an instrumental-variable analysis as well as propensity score matching. All the results are consistent and therefore appear to be robust.[5]

[5] Our study contributes to a crucial area of the literature that examines the effect of corporate governance on firm behavior and outcome during a crisis (for instance, Mitton, 2002; Lemmon and Lins, 2003; Erkens, Hung, and Matos, 2010; Aebi, Sabato, and Schmid, 2012; Grove, Patelli, and Victoravich, 2011; Peni and Vahamaa, 2012; Baek, Kang, and Park, 2004).

CHAPTER III
DO CO-OPTED DIRECTORS BENEFIT FIRM VALUE? EVIDENCE FROM THE FINANCIAL CRISIS

3.1 Introduction

Board of directors is one of the important internal corporate governance mechanisms for monitoring and advising the management in ensuring that the interest of shareholders and the success of company performance are achieved (Jensen, 1993; Blair, 1995). The role of board of directors becomes more critical during the financial crisis. Johnson et al. (2000) argued that managerial entrenchment and expropriation can be more severe when the expected return on investment falls. For this reason, this paper aims to study the impact of effective monitoring from board of director on firm value.

In order to determine what make monitoring effectiveness of the board, scholars and researchers examine the role of boards in various aspects and their impact on firm performance and other corporate outcomes[1]. However, the empirical results between the board attributes and firm performance are weak and inconclusive (Coles et. al., 2008; Adams et. al., 2010). One potential reason for inconsistency and insignificance of empirical results suggested by Coles, Daniel, and Naveen (2014) is many directors are co-opted or influenced by the CEOs.

According to Coles, Daniel, and Naveen (2014), co-option is defined as directors who are appointed after the CEO assumes office. Entrenching CEOs use their social tie to nominate directors on board which create an incentive for directors to return the favor and aversion to monitoring. Their evidence shows that board co-option has the significant effect on the CEO turnover to firm performance, CEO pay levels and firm investment. Moreover, co-opted board also exhibits more explanatory power than does board independence. Despite the effect of co-opted board on different corporate

[1] The board aspects include board size, composition, meetings, CEO and chair duality, and independent directors. For example, Yermack (1996), Anderson and Reeb (2003), Coles, et al. (2008, 2011), Hermalin and Weisbach (1998), Bhagat and Black (1999).

outcomes, the extent to which co-opted board impact firm value is a relatively unexplored area in the literature, especially during the time of crisis.

Our research is designed to investigate the effect of board co-option on firm value and how the effect changes during the time of financial crisis in 2008-2009[2]. During the crisis, the role of board can become more critical than normal times and executive decision-making behavior on any corporate investment can be different. We explore two competing hypotheses. The harmful effect hypothesis suggests that the less restrictive board from social tie development between co-opted directors and CEO allows more opportunistic behavior, thus resulting in a decrease in firm value. The beneficial effect hypothesis, on the other hand, proposes that the loose monitoring from co-opted board brings about the better line of communication between managers and directors (Adam & Ferreira, 2007). As a result, it reduces managerial myopia for long-term investment decision (Chintrakarn et al., 2016), thus improves the firm value.

Furthermore, we exploit the period of crisis during 2008-2009 to construct the natural experiment. This unexpected event provides an opportunity to study the proximate effect of board co-option on firm performance during a period of extreme distress. It represents an exogenous economic shock that disrupts the equilibrium between co- option and firm value by allowing random variations into the model so that the proximate effect of board co-option can be observed. Because the crisis was unanticipated, it is unlikely that firms adopted board co-option before the crisis that would be optimal during the crisis. This should alleviate the endogeneity concerns that make it difficult to identify the impact of co-opted board on firm value. A number of recent studies use this approach to disrupts the equilibrium relationship (Lins et al., 2017; Amiraslani et al., 2017; Jenwittayaroje & Jiraporn, 2019; Chintrakarn, 2020).

The study contributes to the literature in several ways. First, it is the first to examine the impact of board co-option on firm value. Second, it further investigates whether the effect of board co-option on firm value is different during financial crisis than it is during normal times. And lastly, this study exploits the period of financial

[2] Financial crisis is defined following Lins, Volpin, and Wagner (2013); Lins, Servaes, and Tamayo (2017); Amiraslani, Lins Servaes, and Tamayo (2017).

crisis in 2008-2009 as an exogenous shock to disrupts the equilibrium relationship, thus drawing a causal inference and less vulnerable to endogeneity bias.

3.2 Theoretical Framework and Hypotheses

Motivated by the agency theory, the governance mechanism in the form of effective board monitoring on the management should reduce managerial misbehaviors and ensure that benefits of the firm are well protected. Coles, Daniel, and Naveen (2014) suggest that independent board of director is necessary but not sufficient condition for ensuring the board monitoring effectiveness if majority of the directors are co-opted. Along with this line of arguments, a number of researches on board co-option has been developed.

Numerous studies document co-option as a weakened governance mechanism which compromise the board monitoring effectiveness. Jiraporn and Lee (2018a) show that co-opted board leads to a weaker tendency for firms to pay dividends and, for dividend-paying firms, smaller dividends. They argue that board co-option causes a weakened governance mechanism which allows mangers to retain more free cash flow within the firm, rather than pay it out as dividends. Consistently, Withisuphakorn and Jiraporn (2017) examine the effect of co-opted board on CEO power. They found that board co-option is a substitute for CEO power, which weakens corporate governance. Jiraporn et al., (2017) make an argument along these lines, positing that co-opted directors allow managers to take more risk.

Amongst those harms caused by co-option, there is some positive side of board co-option. Due to allegiance that co-opted directors owe to the CEO from the initial appointment, the board with more co-opted members are less likely to remove the CEO and more likely to approve investments recommended by the CEO (Coles, Daniel, and Naveen, 2014). Following this view, Chintrakarn et al., (2016) discover the positive impact on managerial behavior due to board co-option that CEOs become less myopia and therefore more likely to make long-term investment decision that do produce benefits for several years to come. Aside the co-option benefits, Adam & Ferreira (2007) also make an argument that support the benefits of having less restrictive board. They show that the stringent monitoring by directors in decision making produce a negative

impact on firm performance as it negatively affects the communication channel between managers and directors. This notion implies that board with more co-opted directors can improve the quality of communication line and reduce the conflict between the board and CEO which could result in positive effect to the firm performance.

Based on above literature, we develop two competing hypotheses that explain the effect of board co-option on firm value.

3.2.1 Harmful effect hypothesis

Despite being independent of the board, the co-opted directors tend to act in favor of CEO, because CEO was involved in their initial appointment. As a result, board co-option compromises the effectiveness of board monitoring and represents a weak governance mechanism, allowing opportunistic behaviors from incumbent managers to take place. With less oversight board, manager gains more power and act in his best interest rather than shareholders'. This creates an agency cost to the firm and lead to the decrease in firm value. It can be implied that an increase in co-opted board is harmful to firm value. Thus, it is expected that:

H1(a): All else equal, firm value decreases with co-option.

3.2.2 Beneficial effect hypothesis

The initial involvement in appointing directors by CEO makes the co-opted directors less likely to remove the CEO, resulting in a long-term serving position and high investment in firm-specific human capital and projects with long-term payoffs (Coles, Daniel, and Naveen, 2014). Along with this line, Chintrakarn et al. (2016) explore the role of board governance on managerial myopia and its effect on R&D investments. They find that board co-option reduces managerial myopia which makes managers become less likely to forced removal. As a result, CEOs are more willing to take long-term investments, as their serving term will be long enough to see the return on such investments. In additional to the less investment myopia and long-term serving of CEO position, co-opted board can enhance the power of CEO and reduce the possible conflicts between the board and managers. This consolidated power can lead to more timely and effective decision-making (Brickley, Coles, and Jarrell, 1997). Per the view

of less myopic, an increase in co-opted directors can be beneficial to firm value. This leads to our hypothesis:

H1(b): All else equal, firm value increases with co-option.

A number of literature shows that the effect of corporate governance may be different and more pronounced particularly during financial crisis as the crisis may exacerbate managerial entrenchment and expropriation. Jiraporn (2017) and Jenwittayaroje & Jiraporn (2019) studied the effect of board size and board independent during the period of the great recession. They provide the evidence that the larger board size and more board independent can be harmful to firm value but only in the normal times. During the stressful time, firms need more and better expert advice from the board, thus a large board and more outside independent board are beneficial to firm value.

Strong board monitoring should become more important and necessary, especially during the time of crisis. A crisis may exacerbate managerial entrenchment and expropriation. The role of governance in mitigating agency conflicts may be more obvious during a crisis to help protect the wealth of shareholders and prevent any entrenchment and expropriations to take place. Based on literature and the framework, it is hypothesized that:

H2: All else equal, effect of board co-option on firm during financial crisis is different from that in the normal times.

3.3 Data and Methodology

3.3.1 Sample

The data on board of directors are from RiskMetrics. Data on firm value and characteristics are from COMPUSTAT. After combining both databases and excluding financial firms, the final sample consists of 21,824 firm-year observations, with 2,466 unique firms over the period of 1996-2014 (unbalanced panel data).

3.3.2 Data description and measures

3.3.2.1 Co-opted directors

The study follows the definitions and measures on co-option of Coles, Daniel, and Naveen (2014). There are two measures employed in this study, "co-option" and "TW co-option".

"Co-option" is defined as the number of directors appointed after the CEO assumes office, which is known as co-opted directors. The variable is measured as the ratio of the number of co-opted directors over the board size. The value ranges from 0-1, the higher value indicates greater board co-option.

$$Co\text{-}option = \frac{\#\ Co-opted\ directos}{Board\ size}$$

"TW co-option" is defined as the tenure-weighted co-option, which considers the influence of co-opted directors on board decision making through their serving time. It is calculated by the sum of the tenure of co-opted directors divided by the total tenure of all directors, where co-opted director dummy is equal to 1 if the director is co-opted, and 0 otherwise. The value ranges from 0-1, with the higher value indicates stronger board co-option.

$$TW\ Co\text{-}option = \frac{\sum_{i=1}^{board\ size} Tenure_{\ i} \times Co-opted\ Director\ Dummy_i}{\sum_{i=1}^{board\ size} Tenure_i}$$

3.3.2.2 Firm Value

Based on the literatures[3], the measure of firm value is proxied by Tobin's q based on the calculation of Chung and Pruitt (1994). As an alternative, Peters and Taylor's (2017) q is also used in the regression to capture the intangible capital that most popular Tobin's q measure ignores. Peters and Taylor (2017) claim that their measure of Tobin's q is better than other popular Tobin's q proxies as it can better account for firm's investment opportunities.

3.3.2.3 Crisis

Following Lins, Volpin, and Wagner (2013), the financial crisis is defined over the period of 2008-2009 when there are major events and announcements from Federal Reserve, US Treasury, IMF and major central banks took actions to

[3] See, for example, Demsetz and Lehn (1985), Morck, Shleifer, and Vishny (1988), Lang and Stulz (1994), Yermack (1996), and Gompers, Ishii, and Metric (2003).

stabilize the market. For example, the bankruptcy case of Lehman Brothers in 2008, and the bottom hit of S&P 500 in 2009. "Crisis" is measure as a dummy variable, with the value equals to 1 if that is the period of 2008-2009, and 0 otherwise.

3.3.2.4 Control variables

Based on the literatures[4], a large number of control variables that likely influence firm value is included. For firm specific characteristics, the study control for "size" (measured as log of total assets), "leverage" (measured as total debt/total assets), "profitability" (measured as EBIT/total assets), "investments" (measured as capital expenditures/total assets), intangible assets i.e. "R&D" and "Advertising" (as measured by R&D and Advertising/total assets), and "dividend" (as measured by dividend/total assets). Moreover, the paper also controls for the two traditional measures of board effectiveness "board independence" and "board size". The board independence is the % of independent directors on board, whereas the board size represents the total number of directors on board. To control for industries, the industry dummies (based on the first two digits of SIC code) are included.

3.3.3 Descriptive Statistics

Table 3.1 provides the summary statistics for all the variables in the study. The average firm value proxied by Tobin's q is 1.92 with the median of 1.47, whereas Peters and Taylor's (1997) Q has the mean of 1.53 and the median of 0.83. The proportion of firms in the period of financial crisis is 11.2%. The primary variable of interest, Co-option and Tenure-weighted (TW) co-option, have the mean of 0.47 and 0.31 with the median of 0.44 and 0.17, respectively. The average value of Co-option implies that almost half of the board has been co-opted by the CEO. However, the TW co-option representing their influence is lower at 31%. The average board size has ten directors with the average of 72% independent directors. The number of Co-option and Board characteristics are consistent with Coles, Daniel, and Naveen (2014). In terms of firm characteristics, leverage averages 22% of total assets and investment averages 5.1% of total assets. On average, the profitability is 9.1% of total assets.

[4] See, for example, Daniel and Titman (1997), Chintrakarn et al., (2020), Jenwittayaroje & Jiraporn (2019).

Table 3.1 Summary Statistics

This table shows the summary statistics of the sample for the period 1996 to 2014, which drawn from RiskMetrics and COMPUSTAT.

Variables	N	Mean	St.Dev	25th	50th	75th
Firm Value						
Tobin's q	21,818	1.922	1.555	1.138	1.478	2.151
Tobin & Taylor's (2017) q	18,989	1.525	8.013	0.482	0.826	1.524
Co-option						
TW co-option	16,089	0.310	0.329	0.043	0.173	0.494
Co-option	20,935	0.472	0.317	0.200	0.444	0.737
Board Characteristics						
Board Size	21,824	9.464	2.734	8.000	9.000	11.000
Board Independence	21,824	71.911	16.183	62.500	75.000	85.714
Firm Characteristics						
Total Assets	21,823	7.841	1.710	6.588	7.658	8.920
Leverage	21,749	0.220	0.181	0.065	0.205	0.331
R&D	21,824	0.026	0.054	0.000	0.000	0.029
Advertising	21,824	0.011	0.034	0.000	0.000	0.005
Profitability	21,615	0.091	0.104	0.044	0.086	0.136
Investments	21,129	0.051	0.055	0.017	0.035	0.066
Dividend	21,791	0.013	0.029	0.000	0.005	0.018

3.3.4 Empirical Model

Following the tswo competing hypotheses, the baseline empirical model is estimated.

$$Firm\ value_{i,t} = \beta_0 + \beta_1\ Cooption_{i,t} + \beta_2 Crisis + (Other\ Controls) + Industry\ dummies + \varepsilon_{i,t} \quad (1)$$

The variable of interest is Co-option, which has two alternative measures "co-option" and "TW co-option". It is predicted that when there are more co-opted directors on board or the board is highly influenced by co-opted directors through tenure level, the board monitoring effectiveness reduce, allowing managerial entrenchment and expropriation. Thus, firm value should decrease following the harmful effect hypothesis H1(a). That is, β_1 is expected to be negative. Crisis is a dummy variable set equal to 1 for the year period of 2008 and 2009. It is expected that the average firm value become

poorer during the financial crisis period. The coefficient of crisis, β_2, is expected to be negative.

The second hypothesis (H2) is whether the effect of co-opted board on firm value during financial crisis is different from that of the normal time. To test this hypothesis, the empirical model with additional interaction term with crisis is added in equation (2).

$$Firm\ value_{i,t} = \beta_0 + \beta_1\ Cooption_{i,t} + \beta_2\ Crisis_t + \beta_3\ Co\text{-}option*Crisis + \beta_4\ (Other\ Controls) + Industry\ dummies\ + \varepsilon_{i,t} \quad (2)$$

The variable of interest is the interaction term between co-option and crisis dummy. This interaction term allows us to examine the marginal effect of co-option on firm value as when there is an exogenous shock from the financial crisis occurs. The coefficient, β_3 , is expected to display some significant effect on firm value. The same effect should remain true for the interaction term when using an alternative measure of co-option, "TW co-option".

The estimated models include control variables on firm and board characteristics. Moreover, both models include the industry dummies to capture any variations across industries, as certain industry may be more or less prone to the crisis. The study also employs fixed-effect models to account for unobservable omitted characteristics and time-invariant. This should alleviate the problem of omitted variable bias and typical endogeneity concerns, thus the results from the study can be drawn for a causal inference.

3.4 Results and Discussions

3.4.1 Baseline Regressions

Table 3.2 reports the ordinary least square (OLS) regression results. The standard errors are clustered at the firm level. Model 1 and Model 2 have Tobin's Q as the dependent variable. The coefficients of the main variables of interest, co-option and tenure-weighted (TW) co-option, are positive and highly significant. It appears that board co-option leads to increasing firm value, as reflected by the significantly higher value in Tobin's Q. The results support the beneficial effect hypothesis. The variable

Crisis has a negative and significant coefficient, implying that firm value declines significantly during financial crisis.

However, it can be argued that Tobin's Q may not capture total firm value as it ignores intangible capital. As a result, Peters and Taylor's Q is used as another measure for firm value. It is worth noting that from the summary statistics, Peters and Taylor's (1997) Q may suffer from outliers. As a consequent, the variable is winsorized at the 1st and 99th percentiles to minimize the influence of outliers. Model 3 and Model 4 have Peters and Taylor's (2017) Q as the dependent variable. Both co-option and TW co-option exhibit positive and significant coefficients. So, the results suggest that firms with high influence from co-opted board experience significantly higher firm value. The results from the OLS support the beneficial effect hypothesis.

The majority of control variables also show significant coefficients. Traditional board effectiveness measurements, as measured by board size and board independence, are negatively related to firm value which are in line with the prior literature (Eisenberg et al., 1998; Jenwittayaroje & Jiraporn, 2019; Chintrakarn et al., 2020). Firms with large size, high growth in performance and dividend payout tend to have higher value of firm. Consistent with Jiraporn & Liu (2008), the variable leverage shows negative relation to the firm value suggesting the use of debt reduces the firm value.

Table 3.2 Baseline Regressions

This table shows the results of regressions using OLS estimator for the relationship between board co-option and firm value.

	(1)	(2)	(3)	(4)
VARIABLES	Tobin's q		Peters and Taylor's (2017) q	
Crisis (Dummy)	-0.324***	-0.322***	-0.353***	-0.348***
	(0.0230)	(0.0232)	(0.0352)	(0.0354)
TW Co-option	0.163***		0.313***	
	(0.0567)		(0.0749)	
Co-option		0.146***		0.299***
		(0.0543)		(0.0699)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3.2 Baseline Regressions (cont.)

	(1)	(2)	(3)	(4)
VARIABLES	Tobin's q		Peters and Taylor's (2017) q	
Ln (Total Assets)	0.0295*	0.0317*	0.0404*	0.0380*
	(0.0170)	(0.0169)	(0.0225)	(0.0225)
Leverage	-0.569***	-0.611***	-0.652***	-0.649***
	(0.183)	(0.182)	(0.207)	(0.210)
R&D	10.54***	10.40***	6.045***	6.007***
	(0.736)	(0.722)	(0.587)	(0.593)
Advertising	2.237***	2.564***	-0.254	-0.0409
	(0.747)	(0.782)	(0.697)	(0.748)
Profitability	6.103***	6.124***	6.334***	6.343***
	(0.540)	(0.542)	(0.467)	(0.478)
Investments	2.404***	2.331***	0.310	0.262
	(0.434)	(0.431)	(0.444)	(0.449)
Dividend	4.271***	4.177***	2.539**	2.516**
	(1.076)	(1.061)	(1.084)	(1.077)
Ln (Board Size)	-0.442***	-0.463***	-0.558***	-0.564***
	(0.101)	(0.101)	(0.120)	(0.121)
Board Independence	-0.00553***	-0.00562***	-0.00886***	-0.00872***
	(0.00167)	(0.00169)	(0.00153)	(0.00153)
Constant	2.584***	2.667***	2.483***	2.565***
	(0.275)	(0.290)	(0.397)	(0.395)
Observations	15,388	15,154	14,378	14,161
R-squared	0.306	0.305	0.272	0.274
Industry fixed effects	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Additionally, we explore the role of co-opted directors during financial crisis by adding the interaction terms of Crisis and both Co-option and TW co-option using empirical model (2). The results are shown in Table 3.3. The coefficients of both co-option measures remain the same direction and significant after adding the

interaction terms throughout all models. The focus is on the interaction term, as the interaction term shows the marginal effect of co-option on firm value when there is an exogenous economic shock from a financial crisis. As expected, the coefficients on the interaction terms are negative and significant in Model 1 and 2 in which Tobin's Q is the dependent variable. This implies that having co-opted board during financial crisis could significantly compromise the benefit on the firm performance. In other words, co-opted board can be harmful to firm value. Using Peters and Taylor's (2017) Q as an alternative measure for the dependent variable in Model 3 and 4, the coefficients of the interaction terms are negative but do not remain significant. One concern on this inconsistency result is the endogeneity bias that may due to some omitted variables. To alleviate this concern, the fixed-effect model is estimated. The results are shown in Table 3.4.

Table 3.3 Baseline regression during Financial crisis

This table shows the results on the regressions using OLS estimation of the effect of co-option on firm value during financial crisis.

	(1)	(2)	(3)	(4)
VARIABLES	Tobin's q		Peters and Taylor's (2017) q	
Crisis * TW Co-option	-0.183**		-0.129	
	(0.0826)		(0.120)	
Crisis * Co-option		-0.133*		-0.0633
		(0.0703)		(0.105)
Crisis (Dummy)	-0.269***	-0.228***	-0.314***	-0.279***
	(0.0303)	(0.0349)	(0.0421)	(0.0502)
TW Co-option	0.188***		0.330***	
	(0.0632)		(0.0815)	
Co-option		0.131***		0.238***
		(0.0483)		(0.0654)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3.3 Baseline regression during Financial crisis (cont.)

	(1)	(2)	(3)	(4)
VARIABLES	Tobin's q		Peters and Taylor's (2017) q	
Ln (Total Assets)	0.0293*	0.0103	0.0402*	0.0206
	(0.0170)	(0.0139)	(0.0225)	(0.0224)
Leverage	-0.570***	-0.347**	-0.652***	-0.483***
	(0.183)	(0.161)	(0.207)	(0.185)
R&D	10.54***	10.08***	6.047***	5.533***
	(0.737)	(0.660)	(0.587)	(0.562)
Advertising	2.244***	2.516***	-0.250	0.168
	(0.747)	(0.682)	(0.697)	(0.761)
Profitability	6.104***	6.218***	6.334***	6.429***
	(0.540)	(0.480)	(0.467)	(0.446)
Investments	2.407***	2.486***	0.312	0.480
	(0.434)	(0.384)	(0.444)	(0.399)
Dividend	4.270***	3.757***	2.538**	2.064**
	(1.075)	(0.802)	(1.083)	(0.841)
Ln (Board Size)	-0.442***	-0.383***	-0.558***	-0.569***
	(0.101)	(0.0870)	(0.120)	(0.115)
Board Independence	-0.00551***	-0.00568***	-0.00884***	-0.00950***
	(0.00166)	(0.00146)	(0.00153)	(0.00143)
Constant	2.575***	2.527***	2.477***	2.629***
	(0.275)	(0.265)	(0.397)	(0.389)
Observations	15,388	20,192	14,378	17,742
R-squared	0.307	0.328	0.272	0.266
Industry fixed effects	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

3.4.2 Fixed effects Models

The results from OLS might be driven by some unobservable firm characteristics that are omitted in the models. The fixed-effect analysis is used to help mitigate the effect of the omitted-variable bias. Table 3.4 reports the results of fixed-

effects analysis. Both co-option and TW co-option still carry positive and significant coefficients as shown in Model 1 and Model 2. Furthermore, the interaction term between crisis and both co-option measures are negative and statistically significant in both Tobin's Q and Peters and Taylor's (2017) Q as displayed in Model 3 and Model 4. The results on the coefficients of the control variables still are similar, except for the investment that its coefficient becomes significant and positive throughout all the specifications. Therefore, the fixed-effect models confirm that the results are not driven by unobservable characteristics that may be omitted in the model. In addition, the explanatory power of fixed-effect models is much greater than the one obtained from the OLS.

Table 3.4 Fixed-effects regressions

The table shows the fixed-effect analysis for the relationship between firm value and co-option during financial crisis.

	(1)	(2)	(3)	(4)
VARIABLES	Tobin's q		Peters and Taylor's (2017) q	
Crisis * TW Co-option	-0.167***		-0.229***	
	(0.0639)		(0.0814)	
Crisis * Co-option		-0.132**		-0.137*
		(0.0530)		(0.0736)
Crisis (Dummy)	-0.151***	-0.197***	-0.308***	-0.271***
	(0.0328)	(0.0294)	(0.0336)	(0.0394)
TW Co-option	0.218***		0.336***	
	(0.0555)		(0.0544)	
Co-option		0.129***		0.241***
		(0.0382)		(0.0399)
Ln (Total Assets)	-0.529***	-0.419***	-0.328***	-0.299***
	(0.0478)	(0.0367)	(0.0344)	(0.0288)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3.4 Fixed-effects regressions (cont.)

	(1)	(2)	(3)	(4)
VARIABLES	Tobin's q		Peters and Taylor's (2017) q	
Leverage	-0.956***	-0.729***	-0.556***	-0.520***
	(0.157)	(0.131)	(0.140)	(0.124)
R&D	2.817***	3.582***	-1.681**	-1.884***
	(0.919)	(0.831)	(0.751)	(0.690)
Advertising	0.836	-0.221	-1.077	-1.706**
	(1.061)	(0.927)	(0.829)	(0.775)
Profitability	4.193***	4.357***	4.490***	4.473***
	(0.273)	(0.288)	(0.259)	(0.282)
Investments	1.222***	1.718***	1.150***	1.556***
	(0.399)	(0.344)	(0.322)	(0.309)
Dividend	0.836***	1.108***	-0.783*	-0.820**
	(0.320)	(0.293)	(0.404)	(0.347)
Ln (Board Size)	-0.601***	-0.558***	-0.631***	-0.700***
	(0.117)	(0.0957)	(0.0866)	(0.0788)
Board Independence	-0.00282*	-0.00240*	-0.00647***	-0.00729***
	(0.00164)	(0.00136)	(0.000982)	(0.000883)
Constant	7.246***	6.203***	5.360***	5.330***
	(0.608)	(0.474)	(0.322)	(0.272)
Observations	15,388	20,192	14,378	17,742
R-squared	0.605	0.609	0.702	0.695
Adjusted R2	0.541	0.5587	0.599	0.6242
Firm fixed effects	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Overall, the results from both OLS and fixed-effect analysis are consistent with the notion that less restrictive board from co-opted directors is beneficial to the firm value. The beneficial effect results can be explained by two reasons. First, the influential from CEO on co-opted board allows incumbent managers to be less likely removed, consequently become less investment myopia (Chintrakarn et al., 2016). As a

result, firm value can be increased through more long-term investment. Another explanation is that, the social connection between co-opted board and CEO allows power in decision making to be concentrated in one person, CEO, allowing him/her to exercise the power unambiguously to have a unique command. The consolidated power in CEO reduces the conflicts between CEO and directors, facilitating more timely and effective decision-making, and finally better firm performance (Brickley, Coles, and Jarrell, 1997).

However, in the presence of financial crisis, these benefits from having co-opted board are clouded out by the costs, such as managerial entrenchment. During the stressful time, firms likely need strong governance mechanism such as effective board monitoring on any potential opportunistic behavior of managers. Therefore, board co-option compromises the internal monitoring and control especially in the time of crisis and hence inhibit the firm value.

We estimate the magnitude of the effect of board co-option on firm value as follows. For the sake of brevity, we will use TW Co-option in explaining the effects on firm value. TW Co-option can capture the influence of co-opted directors overtime through their tenure term on board. The coefficient of the TW Co-option is 0.218 in Table 3.4 Model 1, and one standard deviation of the percentage of TW Co-option in the sample is 0.329. Thus, an increase in the tenure of co-opted directors on board by one standard deviation would improve the firm value by 0.218*0.329 = 0.071. Since the sample median for Tobin's Q is 1.478, the effect of a board co-option accounts for 4.85% of the median Tobin's Q. With similar calculation during the crisis, the coefficient of the interaction term is -0.167. Thus, addition tenure of co-opted director during the financial crisis would reduce the firm value by 0.167. In other words, each additional tenure co-opted director could harm firm value by about 3.72%. These effects are not only statistically significant but also economically large and meaningful.

3.4.3 Endogeneity and Robustness Check

To confirm that our results are not driven by differences in unobservable characteristics across firms or reverse causality, we reinvestigate the relationship by running several robustness checks. Following Jenwittayaroje & Jiraporn (2019), we perform a fixed-effects instrumental variable analysis (IV) to reduce potential reverse

causality. It could be argued that CEO might adjust their board composition according to the firm's environment. Nevertheless, the financial crisis was largely unanticipated. Because the financial crisis lasted from 2008 to 2009, a period of two years, we use the board co-option from two years earlier (t-2) as our instrumental variable for Board co-option. Therefore, it is unlikely that board co-option prior to the crisis could have been resulted from firm value during the crisis. The results are shown in Table 3.5.

Table 3.5 Fixed-effect instrumental-variable analysis (board co-option from two-year earlier (t-2))

This table shows the fixed-effects instrumental-variable analysis for the relationship between the firm value and instrumented TW Co-option. TW Co-option from two-year earlier (t-2) is used as an instrumental variable for TW Co-option.

	(1)	(2)	(3)
	First Stage	Second Stage	
Dependent Variable	TW Co-option	Tobin_q	Peter &Taylor's q
TW Co-option (t-2)	**0.376*** **		
	(0.0162)		
TW Co-option (Instrumented)		**0.345*** **	**0.601*** **
		(0.0798)	**(0.132)**
Crisis * TW Co-option (Instrumented)		**-0.146**	**-0.336***
		(0.127)	**(0.196)**
Crisis (Dummy)	-0.0146***	-0.162***	-0.181***
	(0.00523)	(0.0367)	(0.0554)
Ln (Total Assets)	0.00436	-0.353***	-0.347***
	(0.00609)	(0.0201)	(0.0366)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3.5 Fixed-effect instrumental-variable analysis (board co-option from two-year earlier (t-2)) (cont.)

	(1)	(2)	(3)
	First Stage	Second Stage	
Dependent Variable	TW Co-option	Tobin_q	Peter &Taylor's q
Leverage	-0.00125	-0.841***	-0.775***
	(0.0268)	(0.0896)	(0.139)
R&D	-0.253**	2.356***	-1.182*
	(0.114)	(0.603)	(0.709)
Advertising	-0.323*	-0.684	-3.274***
	(0.189)	(0.692)	(1.090)
Profitability	0.0314	3.035***	4.059***
	(0.0373)	(0.260)	(0.325)
Investments	0.321***	1.994***	2.112***
	(0.0718)	(0.292)	(0.387)
Dividend	-0.0884	1.131***	-1.332***
	(0.112)	(0.317)	(0.460)
Ln (Board Size)	0.0155	-0.196***	-0.554***
	(0.0199)	(0.0530)	(0.0974)
Board Independence	1.74e-05	-0.00145**	-0.00663***
	(0.000223)	(0.000580)	(0.00108)
Constant	0.103*	4.835***	5.300***
	(0.0608)	(0.196)	(0.353)
Observations	11,108	13,246	12,436
R-squared	0.732	0.785	0.728
Firm fixed effect	YES	YES	YES
F-Statistics	54.56		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Model 1 is the first-stage regression where the dependent variable is TW Co-option. As expected, our instrumental variable, TW Co-option from two years earlier, exhibits strong explanatory power, the coefficient positive and highly

significant. The R^2 of the first-stage regression is relatively high, 73.2%. The F-statistics of the instrumental variable according to Stock & Yogo (2005) is larger than 10, therefore the instrumental variable is less likely weak. Model 2 and Model 3 are the second stage regression where Tobin's Q and Peters and Taylor's (2017) Q, respectively, are the dependent variable. We create the interaction term between financial crisis and TW Co-option instrumented from the first-stage regression. Again, the TW Co-option coefficients remain positive and significant for both measure of firm value. However, the coefficients of the interaction term appear negative and significant only for Peters and Taylor's (2017) Q. The results on Co-option are quantitatively similar. Moreover, to ensure further robustness, we employ an alternative instrumental variable.

Following prior literature (Liu and Jiraporn, 2010; Jiraporn et al., 2013; and Jiraporn and Liu, 2014), we use the industry average of board co-option as our instrumental variable. Due to possible reverse causality that firm value may impact the decision on board co-option of that particular firm. However, firm value at firm-level is unlikely related to industry-level board co-option. CEOs may have influence over their own firm's policies, but they should have little influence over other firms. As a result, industry-level variables are more likely to be exogenous. The first-stage F-statistics of our instrumental variable is greater than 10 indicating that our instrumental variable is not weak (Stock & Yogo, 2005). Table 3.6 shows the results. As expected, the results on the coefficient of instrumented remains the same with relatively high R2. Similar results are obtained in the second stage, the interaction term only shows the significant coefficient for Peters and Taylor's (2017) Q.

Table 3.6 Robustness Check: Fixed-effects instrumental-variable analysis (Industry average)

This table shows the fixed-effects instrumental-variable analysis for the relationship between the firm value and instrumented TW Co-option. The instrumental variable is the industry average of TW Co-option based on the first two digits of the SIC codes.

	(1)	(2)	(3)
	First Stage	Second Stage	
Dependent Variable	TW Co-option	Tobin_q	Peter &Taylor's q
TW Co-option (Industry average)	**0.728*** **		
	(0.0315)		
TW Co-option (Instrumented)		**0.576*** **	**1.150*** **
		(0.218)	**(0.207)**
Crisis * TW Co-option (Instrumented)		**-0.00118**	**-0.725** **
		(0.297)	**(0.331)**
Crisis (Dummy)	-0.0158***	-0.192**	-0.157
	(0.00516)	(0.0908)	(0.0988)
Ln (Total Assets)	0.00237	-0.520***	-0.326***
	(0.00507)	(0.0468)	(0.0343)
Leverage	0.0104	-0.952***	-0.557***
	(0.0229)	(0.155)	(0.140)
R&D	-0.314***	3.370***	-1.272*
	(0.0989)	(0.936)	(0.745)
Advertising	-0.278*	1.001	-0.828
	(0.162)	(1.043)	(0.810)
Profitability	0.0654**	4.039***	4.433***
	(0.0305)	(0.277)	(0.257)
Investments	0.258***	1.114***	0.928***
	(0.0610)	(0.396)	(0.319)
Dividend	-0.0925	0.870***	-0.698*
	(0.0695)	(0.318)	(0.411)

Table 3.6 Robustness Check: Fixed-effects instrumental-variable analysis (Industry average) (cont.)

	(1)	(2)	(3)
	First Stage	Second Stage	
Dependent Variable	TW Co-option	Tobin_q	Peter &Taylor's q
Ln (Board Size)	0.00809	-0.598***	-0.618***
	(0.0166)	(0.114)	(0.0848)
Board Independence	-0.000522***	-0.00223	-0.00570***
	(0.000192)	(0.00162)	(0.000956)
Constant	0.0783	6.993***	4.998***
	(0.0509)	(0.600)	(0.322)
Observations	15,390	15,955	14,861
R-squared	0.698	0.606	0.706
F-Statistics	56.28		

To further confirm the results, we run a propensity score matching in Table 3.7. First, the board co-option variable is divided into four quartiles. The top quartile or the highest co-option during the crisis is selected as the treatment group. We identify an observation in the control group that has the closest propensity score using nine firm characteristics i.e. the nine-control variables in prior regression analysis. Using the matched sample, we run a fixed effect regression analysis. Again, the coefficients of co-option alone remain significant and positive. However, the coefficients of the interaction terms are negative and significant only for Tobin's Q. The inconsistency from the results of interaction terms suggests that that the effect of board co-option on firm value may not be different from that of normal time. It is important to note that the two measures, Tobin's Q and Peters and Taylor's Q, one disregards intangible capital. It implies that board co-option may have a different degree of impact on firm's tangible and intangible capital investment that matter to firm value.

Table 3.7 Robustness Check: Propensity score matching

This table shows the propensity score matching analysis for the relationship between TW Co-option and firm value. High TW Co-option is a dummy variable equal to one if TW co-option is in the highest quartile and zero otherwise. The propensity score is calculated using nine firm and board characteristics (the nine control variables in the regression analysis).

Dependent Variable	(1) Tobin's q	(2) Peters and Taylor's (2017) q
High TW Co-option	**0.247*** **	**0.345*** **
	(0.0452)	**(0.0487)**
Crisis * High TW Co-option	**-0.179** **	**-0.0914**
	(0.0807)	**(0.0875)**
Crisis (Dummy)	-0.152***	-0.427***
	(0.0358)	(0.0411)
Ln (Total Assets)	-0.472***	-0.336***
	(0.0242)	(0.0264)
Leverage	-1.081***	-0.613***
	(0.105)	(0.105)
R&D	1.578***	-1.187***
	(0.409)	(0.408)
Advertising	1.149	-3.548***
	(0.823)	(0.853)
Profitability	4.541***	4.656***
	(0.147)	(0.153)
Investments	1.630***	0.919***
	(0.320)	(0.321)
Dividend	0.200	-1.175**
	(0.492)	(0.577)
Ln (Board Size)	-0.532***	-0.627***
	(0.0754)	(0.0826)
Board Independence	-0.00108	-0.00602***
	(0.000898)	(0.000966)
Constant	6.498***	5.385***
	(0.231)	(0.247)
Observations	15,245	12,952
R-squared	0.689	0.731
Firm fixed effect	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3.5 Conclusions

Prior research shows that co-opted directors may exacerbate managerial entrenchment and agency conflicts because they are appointed after the current CEO assumed office. Coles et al. (2014) show that co-opted directors are associated with less

effective monitoring. We contribute to the literature in this area by investigating the effect of co-opted directors on firm value. Our results from the Fixed-effects analysis demonstrate the favorable effect of board co-option on firm value outside the crisis period. In particular, a rise by tenure co-opted director by one standard deviation would have improved firm value by 4.85%. The beneficial effect of board co-option on firm value remains strictly outside the crisis period. During the financial crisis, only the results from the fixed-effect analyses show that board co-option significantly diminishes firm value by 3.72%. Our results are based on fixed effects regressions and therefore are unlikely driven by the omitted-variable bias. We employ two measures of firm value, i.e. Tobin's Q and Peters and Taylor's (1997) Q. The results on fixed effects analysis are consistent, regardless of how firm-value is measured.

We also run several robustness tests, including IV and PSM. Based on these tests, the results of board co-option outside the crisis are robust and support beneficial effect hypothesis which states that board co-option can significantly improve the firm value. During financial crisis, the results suggest that board co-option is harmful to firm value but is not statistically significant. There are some inconsistent results on the two measures of firm value which may confound the analysis of the co-option effect on firm value during the crisis. This inconsistency leaves some opportunity for further research on whether there is a potential impact of co-option on firm value through tangible and intangible capital investments.

The results of our study contribute to the area of corporate governance literature on the effectiveness of the board of directors and provide evidence that board co-option is a crucial aspect that requires more attention. The policy makers should consider carefully the deviation between truly independent director and independent directors by definition. We also provide new empirical evidences regarding the relation between board effectiveness and firm value by using a new proxy for board efficiency, which capture CEO's influences on board. Finally, our study demonstrate that governance mechanisms may not always function the same way during stressful times as they do during normal times.

CHAPTER IV
BOARD CO-OPTION, OWNERSHIP, ANALYST COVERAGE, AND REGULATION

4.1 Introduction

Motivated by agency theory, the separation between ownership and control creates the conflicts of interest between managers and shareholders known as the agency problems (Berle and Means, 1932; Jensen and Meckling, 1976). Several internal and external governance mechanisms are used to help alleviate the conflicts; however, each has benefits and costs that need to be traded-off. This study aims to investigate the substitution effects between the internal monitoring mechanism with managerial ownership and external monitoring mechanism namely analyst coverage. Additionally, the paper further examines the degree of substitution effects between these mechanisms when the regulation is presented as an exogenous factor.

A tremendous volume of research examines the effectiveness of individual mechanism in achieving the alignment of stakeholders' interests as well as limiting managerial discretions. However, the results are weak and inconsistent[1]. According to Rediker and Seth (1995), one potential reason for the inconsistency is that the operation in resolving the agency problem of various governance mechanisms is not independent of each other because there are the important linkages among various mechanisms[2]. Prior research has examined the linkages between various internal governance mechanisms in the form of substitution and complementary effects (Agrawal and Knoeber, 1996; Bathala and Rao, 1995). Consistently, Booth, Cornett, and Tehranian (2002) examined the use of regulation as the substitution for the internal mechanisms,

[1] The internal monitoring performed by board of directors and mutual monitoring by managers studied by Fama (1980), and Fama and Jensen (1983). Another internal device is share ownership studied by Jensen and Meckling (1976). The external mechanisms include threat of takeover (Grossman and Hart, 1980), monitoring by outside block shareholders (Demsetz and Lehn, 1985).

[2] They provided the empirical evidence on 81 bank holding companies that there are substitution effects between monitoring by outside directors vs. monitoring by large shareholders, mutual monitoring by inside directors, and incentive effects of managerial share ownership.

particularly outside directors, and stock ownership. Recently, Chintrakarn, Treepongkaruna, Jiraporn and Tong (2017) investigated the trade-off effects between governance mechanisms by using the passage of the Sarbanes-Oxley Act (SOX) and found that board independence substitutes for external audit quality.

Motivated by the literature, this paper aims to study the substitution effects between internal monitoring performed by board of directors with managerial ownership and with external governance mechanism, particularly analyst coverage. Prior research mostly focuses on governance attributes that are chosen by the firm or determined by country-specific factors[3]. Analyst coverage is examined in the study because it is neither chosen by the firm nor environmentally specific. Rather, it is determined by factors outside the firm's control. Moreover, several studies also demonstrate that analyst coverage provides benefits in mitigating agency problems through the reduction of information asymmetry (Barth et al., 2001; Lang et al., 2004; Chen et al., 2007; Baik et al., 2010; Jiraporn et al., 2017).

Furthermore, the governance structure may vary systematically by industry (Fama and Jensen, 1983). For example, bank and finance industry has complex and opaque operating business structure. Banks particularly earn revenues from high-risk investment, in which the costs are born to the depositors who provide the main source of fund (Shleifer and Vishny, 1997). Consequently, they need to be effectively monitored by regulator to ensure a well protection on depositors and limitation on risk associated with bank failure. Moreover, financial firms with a large concentrated ownership have more incentive for more risk taking and thus may cause high risk of default (Mehran et al., 2011). The highly regulated firms may not require strong internal monitoring on management as equally as less regulated firms (Booth et al., 2002). Accordingly, this study extends the investigation to the highly regulated firms, i.e. financial companies, to examine the extent to which the substitution effects between governance mechanisms are different from non-financial firms.

This research makes several contributions to the literature. First, this paper contributes to the literature in corporate governance by showing the trade-off between a paramount internal governance mechanism and other unexplored external

[3] For example, firm can increase its value by choosing high quality auditors (Fan and Wong, 2002), by cross-listing into high-disclosure environments (Doidge, Karolyi, and Slutz, 2014).

mechanisms, i.e. analyst coverage. Second, it contributes to the literature that employ co-option as another aspect of measuring quality of board monitoring. Third, it complements to the literature employing analyst coverage as the voluntary external governance mechanisms. Fourth, it contributes to the literature in the area of banking and finance by showing that highly regulated firms may not necessarily need the effective governance mechanisms as much as non-financial firms. Lastly, it contributes to the literature that exploits regulation as an exogenous variable. This paper adopts this approach by investigating the marginal substitution effects between governance mechanisms with the presence of regulation.

4.2 Literature Review and Hypotheses

The important internal mechanism, which has been mostly studied, is the internal monitoring from the board of directors. A stream of research has focused on the effects of board monitoring using the traditional measures, board independent and board composition, on firm performance and value (Chintrakarn, Jiraporn, Tong, and Proctor, 2017; Coles, Lemmon, and Wang, 2012; Adams, Hermaline and Weisbach, 2010; Coles, Daniel, and Naveen, 2008; Yermack, 1996; Jensen 1993). The empirical results are mix and ambiguous.

There are two potential reasons for these puzzling results. First, the traditional measures board independent and board compositions are not good proxies for monitoring effectiveness of the board (Coles, Daniel, and Naveen 2014). They argue that the independent directors perform less effective monitoring because many directors are co-opted, i.e. appointed after the CEO assumes office. They demonstrate that as co-option increases, board monitoring decreases. The co-opted directors, regardless of dependent or independent, are more likely to assign their loyalty to CEO, as the CEO was involved in their initial appointment. In other words, co-opted directors are more aversion to monitoring duty and less independent on the CEO, hence more managerial entrenchment. In addition, board co-option has a much stronger explanatory power than board independence, which leads to a better measure of monitoring ineffectiveness. Following this view, co-opted board is adopted as the measure of weakened internal

monitoring, rather than the traditional measures, i.e. board independent and board composition.

Another reason for the inconclusive results according to Rediker and Seth (1995) is that a number of research assumes the effects of governance mechanisms operate independently. They argued that the level of a particular mechanism should be influenced by the levels of other mechanism which simultaneously operate in a firm by showing the substitution effects between various internal monitoring mechanisms in the U.S. bank holding companies. Likewise, Booth et. al, (2002) provided evidence that internal monitoring mechanisms can be substituted by percentage of stock ownership. Based on this notion, it is suggested that there are different corporate governance attributes that may substitute/complement for each other.

We extend this reasoning to argue that firms with high co-opted board allows managers to engage in more opportunistic behaviors. As a result, alternative governance mechanisms that can align the interest between managers and owners such as managerial ownership can become necessary. Prior literature suggest that a substantial amount of ownership should provide incentives and motivation for executives in making value-maximizing decisions at the lowest possible cost to shareholders (Jensen and Meckling, 1976; Baker et al., 1988; Bhagat et al, 1999; Himmerlberg et al., 1999 Chen et al., 2003; Fich and Shivdasani, 2005). Consequently, the internal monitoring from the board and other monitoring mechanisms become less necessary for controlling agency problems. Based on the literature, it is hypothesized that

H1. Managerial share ownership can serve as a substitute for the weakened internal monitoring performed by co-opted board.

Similarly, entrenched CEOs influence the board and its monitoring effectiveness. The cost of internal monitoring can become too high, and this triggers the need for external control mechanisms (Walsh & Seward, 1990). These external monitoring mechanisms, such as analyst coverage, might be said to substitute for the weak board monitoring. Analyst coverage is considered as a voluntary governance mechanism, and provides tremendous benefits in corporate governance by mitigate agency problems in several ways (Moyer et al., 1989; O'Brien and Bhushan, 1990; Lang and Lundholm, 1996; Baik et al., 2010; Jiraporn et al., 2012). One of the ways is through

the role of financial analyst in monitoring managerial actions, which helps reduce the agency problems related to the separation of ownership and control (Jensen and Meckling, 1976). Another way is through the role of financial analyst as information intermediaries, which helps reduce information asymmetry between managers and market participants (Easley and O'Hara, 2004). The roles of financial analysts in monitoring a firm's activities and providing information to investors can affect investor's decisions and security valuation. As a result, managers are less likely to engage in opportunistic behaviors. Hence, financial coverage is considered as voluntary external corporate governance that reduces the agency costs, and is not under the firm's choice or control. Therefore, the need for the board monitoring should become less necessary when there is a higher level of analyst following. With this notion, it is posited that

H2. The number of analyst coverage on a firm (serving an external monitoring) can be regarded as a substitute for the weakened internal monitoring represented by co-opted board.

Bank and Financial firms are different in nature of business operation and stakeholders[4], resulting in different principal-agents problems (Caprio and Levine, 2002; Levine, 2003; Macey and O'Hara, 2003; and Becht et al., 2012). As pointed out by Flannery (1994), the impact of managerial actions on shareholder wealth is magnified with the structure of bank industry and high degree of leverage in bank operation. Consequently, the need for corporate governance structure in bank and financial firms is different from non-financial firms. Moreover, financial firms are under strictly regulation structure. The corporate governance mechanisms that are normally adopted in non-financial firms, i.e. board of directors and managerial ownership, to monitor and align the interest of managers and owners may be deviated from maximizing firm value, in the way that causing another conflict of interests between other parties, e.g. manager and regulators or manager and debtholders (Adam and Mehran, 2003). The impact of regulation on the effectiveness of corporate governance

[4] Financial firms are different from non-financial firms in several ways; (1) they are highly leveraged as the main source of fund is from depositors (Shleifer and Vishny, 1997), (2) their roles as a financial intermediary and payment system in the economy create high systematic risk especially when they are highly involved in excessive-risk taking behavior. Their failure has serious consequences and therefore they are highly regulated (Flannery, 1998).

in financial firms could be different. Booth et al., (2002) examine if the regulations can be used to substitute for internal mechanisms and found that effective board monitoring of mangers become less necessary in alleviating agency conflicts with the presence of regulations. However, the regulations may promote certain governance mechanism that is effective in controlling for agency costs, hence the complementary effects can exist between regulations and governance devices (Hagendorff et al., 2010). Based on the literature, it can be posited that

H3. The trade-off effects between governance mechanisms in highly regulated firms (financial firms) are different from those in less regulated firms (non-financial firms).

4.3 Data and Methodology

4.3.1 Samples

The source of data on board co-option and board of directors are from RiskMetrics. The data on managerial share ownership is from ExecuComp database. The data on analyst coverage is obtained from the Institutional Brokers Estimation Service (IBES). The data on credit ratings and firm characteristics are from COMPUSTAT. All sources of data are combined over the period 1996 to 2014 with the final sample of 18,727 firm-year observations.

4.3.2 Data description and Measures

4.3.2.1 Board co-option

Following the definition and measures on co-option by Coles, Daniel, and Naveen (2014), board co-option is measured by "co-option" and "TW co-option."

"Co-option" is defined as the number of directors appointed after the CEO assumes office, which is known as co-opted directors. This variable is measured as the ratio of the number of co-opted directors to the board size. The value ranges from 0-1, the higher value indicates greater board co-option.

$$Co\text{-}option = \frac{\#\ Co-opted\ directors}{Board\ size}$$

It is believed that directors appointed by CEO become more co-opted through time. To further consider the degree of influence from co-opted directors on board is to include tenure on board in account, as termed Tenure-Weighted Co-option, "TW co-option".

"TW co-option," tenure-weighted co-option, considers the influence of co-opted directors on board decision making through their serving time. It is calculated by the sum of the tenure of co-opted directors divided by the total tenure of all directors, where co-opted director dummy is equal to 1 if the director is co-opted, and 0 otherwise. The value ranges from 0-1, with the higher value indicates stronger influence on board decision.

$$TW\ Co\text{-}option = \frac{\sum_{i=1}^{board\ size} Tenure_{\ i} \times\ Co-opted\ Director\ Dummy_i}{\sum_{i=1}^{board\ size} Tenure_i}$$

4.3.2.2 Managerial Ownership

"Managerial ownership" is the percentage of common stock owned directly or beneficially by the top-five executives of the firm based on the EXECUCOMP database.

4.3.2.3 Analyst Coverage

"Analyst coverage" or analyst following is defined as the number of unique analysts covering a particular firm in each year. We use natural logarithm to mitigate the effect from skewness. However, since logarithm of zero is not defined, the method is not applicable to firms that are not covered by analysts. We handle this issue by adding +1 to the number of unique analysts before taking logarithm.

4.3.2.4 Regulation

The impact of regulation on the substitution degree is captured through the interaction term between highly regulated firm and other governance mechanisms. Financial firms represent those highly regulated firms and are identified by the first two digits of the SIC code (60-69). A dummy variable, "finance", is created with the value equal to 1 if it is financial firms and 0 otherwise.

4.3.2.5 Control variables

A number of control variables are included following the literature of Booth et al. (2002) to control for firm-specific characteristics. Those variables are related to firm size and performance. The control variables are total assets (book value of assets), leverage (total debt/total assets), market value (the market value of equity plus book value of preferred stock plus book value of debt), profits (Net income/total assets)'', and CEO Tenure (number of years the CEO of firm has been in office).

4.3.3 Descriptive Statistics

Table 4.1 presents the descriptive statistics for the variables used in our analysis. The firms in this sample are generally large, with a mean log of the total asset of 7.78. It also shows that the majority of the firms are profitable with mean EBIT of 9.4% and has leverage of 21.8%. The proportion of financial firms that are highly regulated is 15.6%. Overall, 47% of the directors are co-opted and the average TW-Co-option is 31.3%, which are similar to the prior studies. The mean board size is approximately nine persons and more than 72% of directors are independent. The average CEOs tenure is 7.8 years. The average percentage of managerial ownership from the top-five executives is 2.6%. The average number of analysts following a sample firm each year is 5.2 times.

Table 4.1 Summary Statistics

The table shows the summary statistics for the sample for the period 1996 to 2014, which drawn from Risk Metrics, ExecuComp, IBES and COMPUSTAT.

Variable	N	Mean	Std. Dev.	25th	50th	75th
Co-option						
Co-option	18,076	0.474	0.317	0.200	0.444	0.750
Tenure-weighted Co-option	13,488	0.313	0.330	0.045	0.177	0.500

Table 4.1 Summary Statistics (cont.)

Variable	N	Mean	Std. Dev.	25th	50th	75th
Managerial ownership	18,727	2.608	5.707	0.000	0.461	1.920
No. analyst coverage	18,727	5.288	8.041	0.000	0.000	9.000
No. analyst coverage (only uncovered)	9,323	10.62212	8.556836	4.000	9.000	14.000
Ln(adj. analyst coverage)	18,727	1.090446	1.21704	0.000	0.000	2.302585
Finance	18,727	0.126	0.332	0.000	0.000	0.000
Firm Characteristics						
Ln(Total assets)	18,727	7.783	1.684	6.561	7.604	8.829
Leverage (Total debt/Total asset)	18,727	0.218	0.182	0.060	0.202	0.330
R&D/Total asset	18,727	0.027	0.055	0.000	0.000	0.030
Advertising/Total Assets	18,727	0.011	0.034	0.000	0.000	0.005
EBIT/Total Assets	18,727	0.094	0.103	0.049	0.088	0.138
Capital Exp./Total Assets	18,727	0.051	0.055	0.016	0.035	0.065
Dividends/Total Assets	18,727	0.013	0.030	0.000	0.005	0.018
Board and CEO Characteristics						
Board Size	18,727	9.041	2.452	7.000	9.000	11.000
% Independent Directors	18,727	72.402	16.025	62.500	75.000	85.714
Ceo_tenure	17,003	7.876	17.419	2.000	5.000	11.000

4.3.4 Empirical Model and Expected Outcome

The objective is to establish the linkages if the data on the weakended internal monitoring measured by the co-opted board and other governance attributes namely managerial ownership, analyst coverage, and credit ratings support the subsitution hypotheses. Following Rediker and Seth (1995) and Booth et al., (2002), the first three hypotheses outlined above are tested using regression model of the form:

$$Co\text{-}opted\ Board_{i,t} = \beta_0 + \beta_1\ Managerial\ Ownership_{i,t} + \beta_2\ Analyst\ Coverage_{i,t} + (Other\ Controls) + year\ dummies + \varepsilon_{i,t} \quad (1)$$

The dependent variable is co-opted board which is measured by the two variables "co-opton" and "TW co-option". An increase in the number co-opted directors on board or the influence of co-opted directors on board through their tenure represents a weakened internal monitoring or a weak governance mechanism. It is predicted that a considerable amount of managerial ownership as an internal mechansim should serve as a substitution for weak monitoring caused by co-opted board. Likewise, the external monitoring from increasing number of analyst coverage should substitute for the ineffective monitoring from co-opted board. Therefore, the positive signs for β_1 and β_2 are expected.

To further testing the hypothesis 4, the substitution effects between various governance mechanisms can be different in finance industry in which it is heavily regulated. The same regression model can be extended with the additional interaction terms between the governance mechanisms and finanical firms.

$$Co\text{-}opted\ Board_{i,t} = \beta_0 + \beta_1\ Managerial\ Ownership_{i,t} + \beta_2\ Analyst\ Coverage_{i,t} + \beta_3\ Managerial\ Ownership_{i,t} * Finance + \beta_4\ Analyst\ Coverage_{i,t} * Finance + \beta_5\ Finance + (Other\ Controls) + year\ dummies + \varepsilon_{i,t} \quad (2)$$

This regression model allows us to see the impact of reglation on the substitution between the the three mechanisms. Specifically, the model examine whether the degree of subsitution is affected by the presence of regulations by allowing an exogenous influence from regulation to cause the relationship between governance mechanisms to change. The interaction terms show the marginal impact of substitution between managerial ownership and other external mechanisms on the weakend internal monitoring, co-opted board. That is, β_3 and β_4 are expected to be significant.

The estimated regression models include a number of control variables on firm characteristics that may influence board co-option. Additionally both models include year dummies to control for any time invariant. The fixed-effects models are applied to account for any unobserved omitted variables. Therefore, the results are less likely driven by the problem of omitted variable bias.

4.4 Results and Discussions

4.4.1 Main regression results

To examine the substitution hypothesis on board co-option, a series of regression analysis on empirical model (1) is used. In Table 4.2, Model 1 through Model 4 have Co-option as the dependent variables. Model 1 employs OLS estimation with standard errors clustered around the firm level. Managerial ownership shows a positive and statistically significant coefficient at the 0.01% level. The estimated coefficient of managerial ownership suggests that the firm with a high managerial ownership tends to have a high proportion of co-opted directors on board. This results support hypothesis 1 which argues that managerial ownership can substitute for the weakened internal monitoring performed by co-opted board. Managerial ownership is regard as a a government mechanism that align the interest of shareholders and managers. An increasing in managerial ownership can reduce the agency conflicts, thus a strong monitoring from board is therefore less necessary. An increase in board co-option as a result of the higher managerial ownership is in line with the prior literatures (Baldenius et al., 2014; Shivdasani and Hermack, 1999) that the powerful group of managers due to high ownership can influence the composition and selection of the board of directors. Thus, the influence from high ownership managers can lead to a greater number of co-opted directors.

The coefficient on analyst coverage is positive but insignificant. This may due to possible endogenous relation from unobservable firm characteristics which are correlate with both co-opted board and exogenous variables. Therefore, fixed effects and random effects regression are used to address this issue. The results are shown in Model 2 and Model 3, respectively. The coefficients on managerial ownership remain positive and statistically significant. The R^2 in fixed effects model increase to 60.2%. As expected, the coefficients on analyst coverage appear to be positive and become significant. The results are consistent with the second hypothesis that a higher level of analyst coverage, regarded as an external monitoring force, can substitute for the weak internal monitoring from co-opted board. The positive correlations between analyst coverage and board co-option suggest that strong internal monitoring is less necessary when firms have been followed by a greater number of analysts.

Table 4.2 Effects of Alternative Governance Mechanisms on Board Co-option

This table shows the results of a series of regression analyses of Co-option and TW Co-option against Managerial ownership, Ln(adj. analyst coverage), and control variables; board characteristics and firm characteristics.

	Co-option				Tenure-weighted Co-option			
Model	(1) OLS	(2) Fixed-effect	(3) Random-effect	(4) Tobit	(5) OLS	(6) Fixed-effect	(7) Random-effect	(8) Tobit
Managerial ownership	**0.0101*** **	**0.00724*** **	**0.00821*** **	**0.0126*** **	**0.0113*** **	**0.00817*** **	**0.00882*** **	**0.0138*** **
	(0.00140)	**(0.000872)**	**(0.000573)**	**(0.00126)**	**(0.00140)**	**(0.000870)**	**(0.000590)**	**(0.00105)**
Ln(adj. analyst coverage)	**0.00349**	**0.00791***	**0.00910*** **	**0.00463***	**0.00159**	**0.0136** **	**0.0114*** **	**0.00247**
	(0.00420)	**(0.00457)**	**(0.00319)**	**(0.00250)**	**(0.00509)**	**(0.00556)**	**(0.00372)**	**(0.00296)**
Ln(Total assets)	0.00107	0.0338***	-0.00248	0.000320	0.00232	0.0355***	0.00105	0.00130
	(0.00375)	(0.00711)	(0.00329)	(0.00225)	(0.00434)	(0.00782)	(0.00375)	(0.00268)
Leverage	0.0114	-0.0189	-0.0148	0.0134	0.0111	-0.0261	-0.0241	0.0171
	(0.0278)	(0.0239)	(0.0175)	(0.0178)	(0.0361)	(0.0280)	(0.0192)	(0.0226)
R&D/Total assets	0.296***	-0.216**	-0.0658	0.377***	0.315**	-0.312***	-0.173**	0.407***
	(0.112)	(0.0951)	(0.0689)	(0.0686)	(0.139)	(0.103)	(0.0713)	(0.0846)
Advertising/ Total assets	-0.153	-0.149	-0.179*	-0.213**	-0.114	-0.0886	-0.0938	-0.184
	(0.150)	(0.181)	(0.103)	(0.101)	(0.169)	(0.185)	(0.116)	(0.118)
EBIT/Total Assets	0.0702	0.0128	0.0270	0.0886**	0.0960	0.0119	0.0277	0.126***
	(0.0482)	(0.0309)	(0.0273)	(0.0355)	(0.0584)	(0.0351)	(0.0286)	(0.0433)

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4.2 Effects of Alternative Governance Mechanisms on Board Co-option (cont.)

	Co-option				Tenure-weighted Co-option			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	Fixed-effect	Random-effect	Tobit	OLS	Fixed-effect	Random-effect	Tobit
Capital Exp./Total Assets	-0.0439	0.265***	0.137**	-0.0660	-0.0972	0.244***	0.154**	-0.111
	(0.0874)	(0.0678)	(0.0570)	(0.0558)	(0.109)	(0.0684)	(0.0606)	(0.0705)
Dividends/Total Assets	-0.719***	-0.0555	-0.196**	-0.925***	-1.091***	-0.203**	-0.353***	-1.403***
	(0.146)	(0.0794)	(0.0808)	(0.145)	(0.229)	(0.0985)	(0.0999)	(0.245)
Ln(Board Size)	-0.122***	0.0723***	0.0130	-0.145***	-0.189***	-0.00201	-0.0516***	-0.209***
	(0.0265)	(0.0204)	(0.0148)	(0.0182)	(0.0318)	(0.0205)	(0.0156)	(0.0208)
% Independent Directors	0.000693*	0.00143***	0.00112***	0.000781***	0.000319	0.000258	0.000134	0.000306
	(0.000388)	(0.000253)	(0.000193)	(0.000288)	(0.000419)	(0.000246)	(0.000195)	(0.000257)
Ceo_tenure	0.00244	0.00112	0.00127***	0.00279	0.00147	0.000651	0.000724***	0.00170
	(0.00198)	(0.00106)	(0.000107)	(0.00230)	(0.00129)	(0.000594)	(9.74e-05)	(0.00150)
Constant	0.661***	-0.0511	0.367***	0.708***	0.680***	0.0336	0.409***	0.705***
	(0.0655)	(0.0647)	(0.0371)	(0.0562)	(0.0722)	(0.0676)	(0.0398)	(0.0513)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,606	16,606	16,606	16,606	12,129	12,129	12,129	12,129
R-squared/ Pseudo R-squared	0.076	0.602	0.0516	0.0621	0.089	0.734	0.06	0.0653

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Due to data description on the co-option that is truncated, Tobit model is used in Model 4 as a robustness check. Again, the coefficients of managerial ownership are positive and statistically significant. However, the coefficient on analyst coverage loses its statistical significance to only 10% level. To confirm the results, an alternative measure of board co-option, i.e., tenure-weighted co-option (TW co-option) is employed as the dependent variable in Model 4 through Model 7. The coefficients of the focus variables appear similarly. The coefficients on managerial ownership are positive and significant. However, for those of the analyst coverage are not robust across models. It should be noted that the number of observations on TW co-option is available up to 2010. After merging with the set of data on analyst coverage, the number of observations in the model decreases substantially. This may cause the inconsistency of the results on analyst coverage.

In sum, the multiple regression analysis results strongly support the hypothesis 1, that the managerial ownership can substitute for board co-option in mitigating agency problems through an alignment of interest between managers and shareholders. However, analyst coverage, regarded as the external monitoring force, do not show consistent results which confounds to give a concrete conclusion for the substitution effects on the internal monitoring of board co-option and thus contradict to the second hypothesis. So far, the results from the main regressions only support the first hypothesis that managerial ownership substitute for co-opted board. Therefore, to be prudent we decide not to include the analyst coverage in our further study.

To put the results into perspective, the economic magnitude of substitution effect is estimated. The coefficient for managerial ownership in Model 4 is 0.0126, with a standard deviation of 5.707. Thus, an increase of one standard deviation in managerial ownership brings up the number of co-opted directors by 0.071. With the median of co-opt directors equal to 0.444, a rise in co-opted directors by 0.071 represents an increase by 16.2%. The magnitude of this substitution effect from managerial ownership on board co-option is statistically large and economically meaningful.

4.4.2 Regulations

Having established the general trends in the tradeoffs between managerial ownership and co-option based on the main regressions in Table 4.2, we examine the

impact of regulation as an alternative monitoring mechanism in financial industry by introducing a bank dummy variable into the regression following empirical model 2. Table 4.3 shows regression results. In Model 1 to 4, the dependent variable is the co-option. Using OLS regression with standard errors clustered around the firm level, the coefficient on the bank dummy variable shows positive and significant at the 0.01% level. Interestingly, the results reveal that the co-opted directors on board of the banks (regulated firms) is significantly higher than that for non-regulated firms in the sample. This implies that with strong regulation in financial firms, the stringent internal monitoring from the board of directors is less necessary as it is already substituted by regulations.

In Model 2, the two interaction terms for the financial industry are introduced: Bank x Managerial ownership and Bank x ln (analyst coverage). These interaction terms allow for differences in the trade-off relations in the governance mechanisms between the highly regulated financial firms versus the less regulated firms. The coefficients on both interaction terms are insignificant. This suggests that highly regulated firms and non-regulated firms do not differ in interdependences between mechanisms. The results are contrary with the third hypothesis which predicted that trade-offs between governance mechanisms exist and differ from non-regulated firms. A possible explanation for this outcome is possibly due to the Bank deregulation period in 1990s. According to Kole and Lehn (1999), regulated firms tend to alter their governance structure in the way resembling to those unregulated firms. Bankers and Gompers (2003) suggest that the indifferent trade-offs between governance mechanisms in bank firms is due to the fact that their governance structure is already at optimal.

Table 4.3 Regression Results: Board Co-option and Alternative Governance Mechanisms with the presence of Regulation

This table shows the results of a series of regression analyses of Co-option and TW Co-option against Managerial ownership, Ln(adj. analyst coverage), board characteristics and firm characteristics when the regulation is presence. Firms in financial industry (SIC 6000-6999) are considered regulated. Finance is a dummy variable equal to 1 when the sample firm is in the financial industry and 0 otherwise. The interaction terms between these dummy variables capture the marginal

substitution/complimentary effects of particular governance mechanism in highly regulated firms.

	Co-option				Tenure-weighted Co-option			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	Tobit	Tobit	OLS	OLS	Tobit	Tobit
Managerial ownership	0.0101***	0.0104***	0.0124***	0.0128***	0.0112***	0.0115***	0.0137***	0.0141***
	(0.00140)	(0.00140)	(0.00129)	(0.00130)	(0.00140)	(0.00146)	(0.00104)	(0.00106)
Ln(adj. analyst coverage)	0.00520	0.00428	0.00698***	0.00579**	0.00368	0.00311	0.00504*	0.00465
	(0.00425)	(0.00450)	(0.00246)	(0.00260)	(0.00513)	(0.00548)	(0.00299)	(0.00315)
Finance	**0.0491*** **	**0.0514** **	**0.0630*** **	**0.0634*** **	**0.0658*** **	**0.0704** **	**0.0794*** **	**0.0861*** **
	(0.0180)	**(0.0218)**	**(0.0113)**	**(0.0140)**	**(0.0229)**	**(0.0279)**	**(0.0143)**	**(0.0177)**
Managerial ownership x Finance		**-0.00391**		**-0.00403**		**-0.00396**		**-0.00433**
		(0.00414)		**(0.00265)**		**(0.00421)**		**(0.00324)**
Ln(adj. analyst coverage) x Finance		**0.00810**		**0.0105**		**0.00539**		**0.00379**
		(0.0128)		**(0.0792)**		**(0.0153)**		**(0.00968)**
Ln(Total assets)	-0.00200	-0.00195	-0.00439*	-0.00428*	-0.00197	-0.00198	-0.00395	-0.00397
	(0.00388)	(0.00390)	(0.00230)	(0.00230)	(0.00457)	(0.00461)	(0.00283)	(0.00284)
Leverage	0.0279	0.0297	0.0395**	0.0413**	0.0303	0.0323	0.0408*	0.0427*
	(0.0282)	(0.0283)	(0.0181)	(0.0182)	(0.0367)	(0.0367)	(0.0230)	(0.0231)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.3 Regression Results: Board Co-option and Alternative Governance Mechanisms with the presence of Regulation (cont.)

	Co-option				Tenure-weighted Co-option			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	Tobit	Tobit	OLS	OLS	Tobit	Tobit
R&D/Total assets	0.341***	0.349***	0.444***	0.452***	0.365***	0.373***	0.469***	0.476***
	(0.112)	(0.113)	(0.0696)	(0.0699)	(0.140)	(0.140)	(0.0855)	(0.0858)
Advertising/Total assets	-0.126	-0.133	-0.186*	-0.193**	-0.0830	-0.0900	-0.147	-0.154
	(0.149)	(0.149)	(0.0983)	(0.0983)	(0.168)	(0.168)	(0.117)	(0.117)
EBIT/Total Assets	0.0930*	0.0976**	0.123***	0.128***	0.122**	0.127**	0.157***	0.162***
	(0.0484)	(0.0486)	(0.0358)	(0.0359)	(0.0594)	(0.0595)	(0.0439)	(0.0440)
Capital Exp./Total Assets	0.0257	0.0255	0.0352	0.0348	-0.00960	-0.0103	-0.00666	-0.00774
	(0.0893)	(0.0893)	(0.0573)	(0.0573)	(0.112)	(0.112)	(0.0726)	(0.0727)
Dividends/Total Assets	-0.701***	-0.698***	-0.918***	-0.915***	-1.041***	-1.038***	-1.339***	-1.335***
	(0.145)	(0.145)	(0.144)	(0.144)	(0.224)	(0.224)	(0.240)	(0.240)
Ln(Board Size)	-0.126***	-0.126***	-0.147***	-0.147***	-0.192***	-0.193***	-0.213***	-0.213***
	(0.0265)	(0.0265)	(0.0188)	(0.0188)	(0.0316)	(0.0317)	(0.0207)	(0.0207)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.3 Regression Results: Board Co-option and Alternative Governance Mechanisms with the presence of Regulation (cont.)

Model	Co-option				Tenure-weighted Co-option			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	Tobit	Tobit	OLS	OLS	Tobit	Tobit
% Independent Directors	0.000781**	0.000769**	0.000620***	0.000613***	0.000420	0.000412	0.000408	0.000406
	(0.000387)	(0.000387)	(0.000218)	(0.000218)	(0.000420)	(0.000420)	(0.000257)	(0.000257)
Ceo_tenure	0.00242	0.00242	0.00271	0.00271	0.00145	0.00145	0.00168	0.00168
	(0.00197)	(0.00197)	(0.00221)	(0.00221)	(0.00127)	(0.00128)	(0.00148)	(0.00148)
Constant	0.668***	0.668***	0.717***	0.718***	0.691***	0.691***	0.720***	0.720***
	(0.0654)	(0.0654)	(0.0512)	(0.0511)	(0.0719)	(0.0719)	(0.0513)	(0.0513)
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES
Observations	16,606	16,606	16,606	16,606	12,129	12,129	12,129	12,129
R-squared/ Pseudo R-squared	0.078	0.078	0.064	0.0643	0.092	0.092	0.0676	0.0678

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We further use Tobit regression in Model 3 and 4. The results remain the same as in the OLS estimations shown in Model 1 and 2. For robustness check, we use alternative measure of board co-option, i.e. tenure-weighted co-option (TW co-option) as the dependent variable. The results reported in Model 5 to 8 mirror those reported under the co-option as dependent variable. The evidence confirms that the trading off mechanisms; particularly between managerial ownership and co-option board, and between analyst coverage and co-option board, in highly regulated firms are in a similar manner with unregulated firms. Overall, the results are consistent through all models and seem to be robust. The evidence corroborates that regulations do not impact trade-offs between governance mechanisms which contrasts Booth et al.'s (2002) results.

4.4.3 Endogeneity and Robustness checks

So far, the main regression results strongly show that managerial ownership can substitute for the weakened board monitoring from co-opted directors. We draw the conclusion assuming that the co-opted board is an outcome from the greater alignment of interest among managers via managerial ownership. Nevertheless, it can be argued that the direction of causality is reversed (i.e., co-opted board has an impact on amount of managerial ownership). To demonstrate that the results are robust to endogeneity, a number of empirical tests are executed. Following the method for dealing with endogeneity based on Jiraporn & Liu (2008) and Liu & Jiraporn (2010), first we examine the managerial ownership in the prior years and construct the lag variables. Evidently, the managerial ownership in the earlier year cannot be a result from the board co-option in the following years. Therefore, if we find that the managerial ownership in the earlier year is related to co-opted board, it is much more likely that the causality runs from managerial ownership to co-opted board than vice versa. We replace the managerial ownership in each given year by managerial ownership in the earlier year and run regression. Due to the loss of number of observations from each lag, we only examine up to three lags. The results on coefficients are significant up to two lags.

Table 4.4 Robustness Check: Reverse Causality

This table shows the results of regressions using Fixed-effects and Tobit analyses with standard errors cluster by firm. The regressions show the relationship between Co-option/TW Co-option against prior years of Managerial ownership; Managerial ownership (t-1) and Managerial ownership (t-2) are the one year earlier and two year earlier of managerial ownership, respectively.

	Co-option				Tenure-weighted Co-option			
	Fixed-effect		Tobit		Fixed-effect		Tobit	
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Managerial ownership (t-1)	**0.00274*** **		**0.00537*** **		**0.00477*** **		**0.00846*** **	
	(0.000689)		**(0.000740)**		**(0.000716)**		**(0.000908)**	
Managerial ownership (t-2)		**0.000490***		**0.00377*** **		**0.00310*** **		**0.00660*** **
		(0.000728)		**(0.000743)**		**(0.000791)**		**(0.000915)**
Ln(Total assets)	0.0198***	0.0205***	0.00350	0.00283	0.0231***	0.0201**	0.00562**	0.00415
	(0.00650)	(0.00719)	(0.00221)	(0.00231)	(0.00744)	(0.00835)	(0.00275)	(0.00292)
Leverage	-0.0254	-0.00626	0.0268	0.0294	-0.0234	-0.00559	0.0184	0.0201
	(0.0223)	(0.0243)	(0.0182)	(0.0192)	(0.0240)	(0.0262)	(0.0240)	(0.0254)
R&D/Total assets	-0.179*	-0.236**	0.505***	0.548***	-0.309***	-0.294***	0.551***	0.617***
	(0.0977)	(0.107)	(0.0677)	(0.0741)	(0.0951)	(0.106)	(0.0867)	(0.0975)
Advertising/Total assets	-0.532***	-0.542***	0.0374	-0.0864	-0.407**	-0.390*	0.0134	-0.108
	(0.161)	(0.209)	(0.103)	(0.118)	(0.187)	(0.236)	(0.129)	(0.154)
EBIT/Total Assets	0.0138	0.0203	0.0912**	0.103**	0.0152	0.0264	0.121**	0.136***
	(0.0335)	(0.0365)	(0.0375)	(0.0400)	(0.0358)	(0.0393)	(0.0481)	(0.0507)
Capital Exp./Total Assets	0.212***	0.244***	-0.0364	-0.0304	0.200***	0.178**	-0.120	-0.124
	(0.0707)	(0.0781)	(0.0583)	(0.0617)	(0.0747)	(0.0837)	(0.0763)	(0.0826)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.4 Robustness Check: Reverse Causaility (cont.)

Model	Co-option				Tenure-weighted Co-option			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Fixed-effect		Tobit		Fixed-effect		Tobit	
Dividends/Total Assets	-0.0771	-0.0976	-0.921***	-0.892***	-0.262**	-0.408***	-1.566***	-1.583***
	(0.0876)	(0.0940)	(0.149)	(0.155)	(0.122)	(0.146)	(0.265)	(0.302)
Ln(Board Size)	0.124***	0.146***	-0.105***	-0.0887***	0.0315	0.0507**	-0.169***	-0.147***
	(0.0180)	(0.0198)	(0.0168)	(0.0176)	(0.0193)	(0.0216)	(0.0209)	(0.0225)
% Independent Directors	0.00133***	0.00112***	0.00188***	0.00195***	0.000239	-0.000208	0.00145***	0.00156***
	(0.000227)	(0.000246)	(0.000260)	(0.000272)	(0.000233)	(0.000255)	(0.000300)	(0.000318)
Ceo_tenure	0.0124***	0.0126***	0.0166***	0.0171***	0.0100***	0.00995***	0.0146***	0.0148***
	(0.000352)	(0.000371)	(0.000436)	(0.000442)	(0.000396)	(0.000421)	(0.000612)	(0.000625)
Constant	-0.0967	-0.143**	0.443***	0.401***	0.0193	0.0141	0.447***	0.387***
	(0.0597)	(0.0668)	(0.0414)	(0.0438)	(0.0664)	(0.0754)	(0.0497)	(0.0535)
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES
Observations	13,927	12,332	13,927	12,332	9,808	8,442	9,808	8,442
R-squared/ Pseudo R-squared	0.646	0.644	0.1525	0.1683	0.760	0.755	0.1275	0.1351

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For conciseness, we do not show the entire multiple regressions. The results in Table 4.4 shows the coefficient of two-year lag of managerial ownership. In Model 1 and 2, we use firm year fixed-effects regression which controls for unobservable firm characteristics that remain constant through time. The result is consistent with previous finding, with positive and significant coefficient on the earlier year managerial ownership. In Model 3 to 4, we use a Tobit regression instead and still obtain a similar result. We replicate the first four regressions with an alternative measure of dependent variable, TW co-option in Model 5 to 8. The results remain unchanged. The results in Table 4.4 considerably improve the odds that causality goes from co-opted board to managerial ownership and not the other way around.

To further confirm that endogeneity concern is alleviated, we execute an analysis using the two-stage least squares (2SLS) estimation. This method requires instrumental variables that are related to managerial ownership but cannot correlated with co-opted directors except through managerial ownership. We select the industry mean and industry medians of managerial ownership as our instruments based on a strand of literatures (Liu and Jiraporn, 2010; Jiraporn et al., 2013; and Jiraporn and Liu, 2014) Although it is possible that, at firm level, the co-opted board in a particular firm might influence the firm's level of managerial ownership, it is unlikely to be related to industry-level managerial ownership. Managers may have influence over their own firm's governance but they should have little influence, if any, on other firm's governance. Thus, the industry-level managerial ownership is likely exogenous and should be a valid instrument.

Table 4.5 shows the two-stage least squares (2SLS) regression results. Model 1 shows the first stage with managerial ownership as a dependent variable. The instrument, industry-mean managerial ownership, exhibits a positive and significant coefficient. As expected, industry-level managerial ownership significantly explains firm-level managerial ownership. The R-square for the first stage regression is relatively high, 80.8%, implying that most of the variation in the firm performance is captured by the explanatory variables in the model. In the second stage regression, we replace managerial ownership with predicted managerial ownership from the first stage. The coefficients of predicted managerial ownership on both co-option and TW co-option are significantly positive as shown in Model 2 and Model 3. The similar results are obtained

on the industry-median managerial ownership as an alternative instrument, the predicted managerial ownership from industry median continues to produce a significantly positive coefficient in Models 5 and 6. It is worth to note that all models employ fixed-effects and include year dummies to control for any omitted variable bias and time invariant. The F-statistics of the instrumental variables for both industries mean and median in Model 1 and 4 are both greater than 10, which confirms that weak instruments are less likely (Stock & Yogo, 2005). Again, the results based on 2SLS with fixed-effects confirm that managerial ownership is a substitute for weak co-opted board with less likely driven by unobserved heterogeneity.

Table 4.5 Robustness checks: Instrumental Variable Analysis

This table shows the instrumental variable analysis for the relationship between Co-option/TW Co-option and Predicted Managerial ownership. The two instrumental variables are the industry mean and industry median of Managerial owenrship based on the first two digits of the SIC codes. Predicted Managerial ownership from mean is the intrumented obtained from the first stage fixed-effect regression in model (1) using Industry mean Managerial ownership as the instrumental variable. Predicted Likewise, Predicted Managerial ownership from median is the instruemented obtained from fixed-effect regression in model (4) using Industry median Mangerial ownership as the instrumental variable.

	Using Industry Mean of Managerial Ownership as instrument			Using Industry Median of Managerial Ownership as instrument		
	(1)	(2)	(3)	(4)	(5)	(6)
	First Stage	Second Stage		First Stage	Second Stage	
Dependent Variable	Management Ownership	Co-option	TW Co-option	Management Ownership	Co-option	TW Co-option
Industry Mean Managerial ownership	0.663***					
	(0.0188)					
Predicted Managerial ownership (from mean)		**0.0123*** **	**0.00807*** **			
		(0.00235)	**(0.00244)**			
Industry Median Managerial ownership				0.587***		
				(0.0207)		
Predicted Managerial ownership (from median)					**0.0177*** **	**0.0106*** **
					(0.00288)	**(0.00285)**

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4.5 Robustness checks: Instrumental Variable Analysis (cont.)

	Using Industry Mean of Managerial Ownership as instrument			Using Industry Median of Managerial Ownership as instrument		
	(1)	(2)	(3)	(4)	(5)	(6)
	First Stage	Second Stage		First Stage	Second Stage	
Dependent Variable	Management Ownership	Co-option	TW Co-option	Management Ownership	Co-option	TW Co-option
Ln(Total assets)	-0.600***	0.0372***	0.0370***	-0.555***	0.0400***	0.0383***
	(0.0724)	(0.00613)	(0.00679)	(0.0733)	(0.00618)	(0.00682)
Leverage	0.954***	-0.0229	-0.0262	1.016***	-0.0281	-0.0282
	(0.250)	(0.0210)	(0.0221)	(0.254)	(0.0211)	(0.0222)
R&D/Total assets	-2.105*	-0.204**	-0.307***	-2.102*	-0.194**	-0.303***
	(1.127)	(0.0928)	(0.0897)	(1.143)	(0.0928)	(0.0897)
Advertising/Total assets	-0.0629	-0.148	-0.104	-0.723	-0.137	-0.106
	(1.594)	(0.131)	(0.151)	(1.616)	(0.131)	(0.151)
EBIT/Total Assets	-0.0466	0.0143	0.0161	-0.170	0.0144	0.0167
	(0.347)	(0.0303)	(0.0312)	(0.352)	(0.0303)	(0.0312)
Capital Exp./ Total Assets	1.551*	0.266***	0.256***	1.594*	0.259***	0.254***
	(0.805)	(0.0666)	(0.0685)	(0.817)	(0.0666)	(0.0685)
Dividends/Total Assets	-3.318***	-0.0300	-0.195*	-3.396***	-0.00626	-0.181*
	(1.031)	(0.0854)	(0.106)	(1.046)	(0.0857)	(0.107)
Ln(Board Size)	0.0682	0.0726***	-0.00262	0.00576	0.0723***	-0.00339
	(0.203)	(0.0169)	(0.0175)	(0.206)	(0.0169)	(0.0175)
% Independent Directors	-0.0224***	0.00155***	0.000260	-0.0232***	0.00167***	0.000324
	(0.00255)	(0.000219)	(0.000219)	(0.00259)	(0.000222)	(0.000222)
Ceo_tenure	0.00905***	0.00107***	0.000629***	0.00960***	0.00101***	0.000602***
	(0.00132)	(0.000111)	(0.000101)	(0.00134)	(0.000112)	(0.000102)
Constant	6.677***	-0.0937	0.0363	8.058***	-0.138**	0.0163
	(0.664)	(0.0585)	(0.0629)	(0.671)	(0.0601)	(0.0639)
Fixed Effects	YES	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES	YES
Observations	17,003	16,606	12,129	17,003	16,606	12,129
R-squared	0.808	0.599	0.730	0.802	0.599	0.730
F-Statistics	69.000			52.260		

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Furthermore, we execute additional analysis using propensity score matching (PSM) in Table 4.6. We sort the sample by managerial ownership. We regard the firms in the highest quartile as a "treatment" group by creating High managerial ownership dummy variable equal to one if Managerial ownership belong to the highest quartile and zero otherwise. Then, we identify firms outside the treatment group whether they are similar using propensity score matching. The matching is based on firm and board characteristics (i.e., the ten control variables in the regression analysis). Therefore, the treatment and control firms are virtually identical in terms of observable characteristics. The only difference is that the treatment group has higher managerial ownership. If managerial ownership is not a substitute for co-option, the two groups of firms would exhibit a similar level of co-opted board.

Using the matched sample, we run a fixed-effect and Tobit regression analysis on the co-option whose results are shown in Model 1 and 2. As expected, the coefficients on High managerial ownership are positive and statistically significant. In model 3 and 4 we use TW co-option as dependent variable and replicate the prior regression analyses. Consistent with prior results, the statistically positive coefficient on High managerial ownership confirms the first hypothesis that managerial ownership is a substitute for co-option.

Table 4.6 Robustness Check: Propensity Score Matching

This table shows the propensity score matching analysis for the relationship between Co-option/ TW Co-option and Managerial ownership. High managerial ownership is a dummy variable equal to 1 if Managerial owenership is in the highest quartile and 0 otherwise. The propensity score is calculated by using ten board and firm charateristics (the ten control variables in the regression analysis).

Model	Co-option		Tenure-Weighted Co-option	
	(1)	(2)	(3)	(4)
	Fixed-effect	Tobit	Fixed-effect	Tobit
High Managerial ownership	**0.00336*** **	**0.00775*** **	**0.00398*** **	**0.00911*** **
	(0.000625)	**(0.000810)**	**(0.000656)**	**(0.000954)**
Ln(Total assets)	0.0508***	0.0122***	0.0255***	0.0122**
	(0.00853)	(0.00432)	(0.00955)	(0.00537)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.6 Robustness Check: Propensity Score Matching (cont.)

	Co-option		Tenure-Weighted Co-option	
	(1)	(2)	(3)	(4)
Model	Fixed-effect	Tobit	Fixed-effect	Tobit
Leverage	-0.00120	-0.0144	-0.0250	-0.0171
	(0.0275)	(0.0281)	(0.0287)	(0.0371)
R&D/Total assets	0.0858	0.721***	0.0345	0.872***
	(0.128)	(0.104)	(0.125)	(0.133)
Advertising/Total assets	-0.0375	-0.396***	-0.0583	-0.473***
	(0.128)	(0.111)	(0.153)	(0.127)
EBIT/Total Assets	0.0211	0.0469	0.0199	0.0715
	(0.0371)	(0.0507)	(0.0404)	(0.0656)
Capital Exp./Total Assets	0.203***	-0.175**	0.164**	-0.385***
	(0.0768)	(0.0799)	(0.0794)	(0.106)
Dividends/Total Assets	0.0112	-1.060***	-0.422***	-1.767***
	(0.124)	(0.222)	(0.143)	(0.363)
Ln(Board Size)	-0.0111	-0.154***	-0.0531**	-0.211***
	(0.0233)	(0.0241)	(0.0243)	(0.0302)
% Independent Directors	0.00144***	0.000949***	0.000129	0.000221
	(0.000268)	(0.000355)	(0.000276)	(0.000415)
Ceo_tenure	0.000477***	0.00222	0.000303***	0.00176
	(9.37e-05)	(0.00183)	(8.49e-05)	(0.00154)
Constant	0.163**	0.738***	0.352***	0.763***
	(0.0688)	(0.0612)	(0.0744)	(0.0737)
Year dummies	YES	YES	YES	YES
Observations	7,984	7,984	6,018	6,018
R-squared/Psuedo R-squared	0.760	0.0401	0.857	0.0401

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.5 Conclusions

Previous research shows how various governance mechanisms interact with one another in reducing agency problems. Our research explores the trade-offs between co-option with internal and external governance mechanisms. In particular, we investigate whether board co-option which constitute a weakened mechanism can be substituted by managerial ownership and the external monitoring provided by analyst

coverage. Prior research shows that co-opted directors represent a weakened governance mechanism (Coles, Daniel, and Naveen, 2014) which can affect the corporate outcomes. Built on prior research, the results show that the weakened monitoring from board co-option is substituted by managerial ownership. The higher level of managerial ownership reduces the conflict of interest between managers and shareholders and thus make strong board monitoring less necessary. However, the results on analyst coverage do not strongly show the significant substitution on co-opted board as the results are not consistent across all the models.

We extended the studies to the firms in which regulation is more stringent and examine the degree of trade-offs between these mechanisms. Surprisingly, we found that highly regulated firms have a greater number of co-opted directors. However, with the stronger regulations, the efficient board monitoring is less necessary. Moreover, the degree of the substitution effect of managerial ownership for co-opted board is insignificantly different from less regulated firms. In other words, under rigid regulation environment firms do not have to rely on internal monitoring or managerial ownership to control for management activities because regulators already perform the monitoring function. For robustness, we employ alternative measure of board co-option, i.e., TW co-option. The results remain consistent. We further execute a number of tests to ensure that the results are not driven by endogeneity. In particular, we run a fixed-effects analysis using earlier year of managerial ownership, an instrumental-variable analysis, and propensity score matching. The results are consistent and robust which make our study less vulnerable to endogeneity problem.

CHAPTER V
CONCLUSIONS

This dissertation investigates the impact of board co-option as the alternative measure for the quality of board monitoring, following Coles, Daniel, and Naveen (2014). I explore board monitoring effectiveness from a different perspective, by measuring the CEO's influence over the board through the proportion of directors appointed by CEO, known as board co-option. The findings in the dissertation are consistent with the previous literature that board co-option, which implies weakened monitoring, appears to have higher explanatory power than the traditional board monitoring proxies. Along with this notion, I extend the study of the board co-option to explore its impacts on the managerial risk-taking decisions and firm value, especially during the financial crisis 2008-2009. The dissertation further analyzes the possibility of alternative governance mechanisms that can substitute for ineffective monitoring by co-opted boards.

The study in Chapter II shows the impacts of board co-option on firm risk during a stressful time, 2008-2009 the financial crisis. The results in the study are in line with prior research that co-opted directors adversely affect the quality of board monitoring. That is, boards with higher co-opted directors exhibit significantly lower firm risk during the financial crisis. Consistent with the literature, managers' wealth and risk exposure during the crisis become more serious and results in a high degree of risk-aversion. Boards with more co-opted directors become less restrictive, allowing CEO to have more power in pursuing his own risk preference and choosing sub-optimal strategies, thus decreasing the risk of the firm.

Chapter III examines the effect of board co-option on firm value. The findings in the study show that governance mechanisms do not function the same way during stressful times as they do during normal times. Board co-option tends to improve firm value during normal times, which confirms to the findings from earlier studies that co-opted boards reduce managerial myopia and result in more R&D investments and

higher firm wealth. However, the beneficial effect of board co-option on firm value disappears during the crisis. The results from the fixed-effect analyses demonstrate that board co-option significantly diminishes firm value. Therefore, effective board monitoring of any opportunistic behaviors during stressful times is necessary. The robustness tests by IV and PSM during the crisis show some inconsistency in the results from the two measures of firm value. This raises a question about the validity of measuring firm value and also leaves some opportunity for further research for the possible indirect impact of tangible and intangible capital investments.

In Chapter IV, the study focuses on the link among alternative governance mechanisms in terms of substitution effects on the weakened monitoring due to board co-option. The alternative governance mechanisms used in the study are managerial ownership, analyst coverage, and regulations. The findings suggest that only managerial ownership can serve as a substitute for the ineffective monitoring in the presence of board co-option. The results on analyst coverage, which represents a form of external monitoring, do not show consistent substitution effects on co-option. The study is extended to examine the possible trade-off effects from regulations. By restricting the sample to firms in the financial industry in which regulation is stringent, it shows that financial firms have more co-opted directors on their boards than less regulated firms. Moreover, substitution effects from managerial ownership and analyst coverage are not found. These findings suggest that under rigid regulations, other alternative governance mechanisms become less necessary.

All topics in this dissertation employ a sample of U.S. firms and other variables used in the study from variety of databases during the period of 1996-2014. The sample covers firms from all industries, including regulated industries, i.e. financial and utility firms. The sample selection is limited within U.S. firms and during this period because of the availability of detailed data on board co-option. This allows a comparison of these results to those in prior research. However, it also provides an opportunity for the future research to explore the generalization of the concepts and results in various context: for example, regional markets with differences in political and regulatory systems, and different cultural backgrounds.

The findings of this dissertation on board co-option provide important implications to many stakeholders. Understanding the impact of the co-opted board on

firm value and managerial risk-taking behavior together with its associated function to other governance mechanisms provide insights to investors and shareholders, who rely on effective board monitoring, to be more aware of how the board is formed and influenced by the CEO. The results should be relevant for regulators and policy makers concerned in setting the regulations and requirements that limit the direct influence of the CEO in the board nomination process, as well as determining the qualifications of effective boards. Furthermore, the findings should be useful to financial institutions, rating agencies, and financial analysts who seek to evaluate the good governance of a firm by considering the aspect of board co-option along with other governance attributes. Lastly, it should provide a debate to corporate decision makers concerning the appropriateness of different governance mechanisms and the extent of their substitutability in different contexts and industries, depending on the level of regulations.

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