Research Article

Shedding Light on the Role of Corporate Governance and Firm Risk in Emerging Markets: Evidence from Thailand

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ABSTRACT

Using a sample of 448 non-financial listed firms in the Stock Exchange of Thailand (SET) between 2015 and 2019, we investigate whether corporate governance (CG) practices are associated with firm risk. Due to limited CG data availability and scant research in emerging markets, this study adds to the literature by utilizing comprehensive CG measures to examine its effect on firm risk for SET listed firms. Overall, we find that firms with enhanced CG practices experience lower variability in stock returns. When examining individual CG attributes, we show that the proportion of independent board members, family ownership, board compensation, board meeting attendance, audit committee meeting attendance, and auditor quality lead to firm risk reduction. Results have practical implications for managers, regulators, and investors. Managers are incentivized to enhance their firms' CG standards to lower idiosyncratic risk. Regulators can better monitor firms' good CG practices to reduce variability in stock returns for the benefits of investors and other stakeholders in the capital markets.

Keywords: Corporate governance, Corporate governance index, Board attributes, Risk, Firm risk, Emerging markets, Firm Risk in Stock Exchange of Thailand

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บทคัดย่อ

บทความวิจัยฉบับนี้จัดทำขึ้น เพื่อศึกษาความสัมพันธ์ระหว่างการกำกับดูแลกิจการและความเสี่ยงของบริษัทที่จดทะเบียนในตลาดหลักทรัพย์แห่งประเทศไทย (SET) จำนวน 448 บริษัท (ยกเว้นกลุ่มอุตสาหกรรมการเงิน) ระหว่างปี พ.ศ. 2558-2562 เนื่องจากข้อจำกัดในการเข้าถึงข้อมูลคุณลักษณะของการกำกับดูแลกิจการ กอปรกับงานวิจัยในสาขานี้ที่ยังขาดแคลนสำหรับตลาดเศรษฐกิจเกิดใหม่ งานวิจัยฉบับนี้จึงเน้นศึกษาและเก็บรวบรวมข้อมูลการกำกับดูแลกิจการที่ครอบคลุมหลายมิติ เพื่อให้เข้าใจถึงผลกระทบที่มีต่อความเสี่ยงของบริษัทใน SET ผลการศึกษาพบว่า บริษัทที่ได้รับคะแนนประเมินการกำกับดูแลกิจการที่สูงขึ้นจะส่งผลให้ความเสี่ยงของบริษัทลดลง นอกจากนี้ผลการศึกษาคุณลักษณะต่าง ๆ ของการกำกับดูแลกิจการภายในบริษัทพบว่า อัตราส่วนของกรรมการอิสระ สัดส่วนการถือครองหุ้นของครอบครัว ค่าตอบแทนของกรรมการบริษัท อัตราส่วนการเข้าร่วมประชุมของคณะกรรมการบริษัทและคณะกรรมการตรวจสอบ ที่มีค่าสูงขึ้น รวมถึงคุณภาพของผู้ตรวจสอบบัญชีที่ดี จะช่วยลดความเสี่ยงของบริษัทได้ ผลการวิจัยนี้จึงมีประโยชน์ในเชิงปฏิบัติต่อผู้บริหาร หน่วยงานที่กำกับดูแลบริษัทใน SET และนักลงทุน โดยผู้บริหารมีแรงจูงใจที่จะส่งเสริมให้บริษัทมีการกำกับดูแลกิจการที่ดีขึ้น เพื่อลดความเสี่ยงของบริษัท ในขณะที่หน่วยงานที่กำกับดูแลบริษัทใน SET สามารถที่จะควบคุมให้บริษัทปฏิบัติตามนโยบายการกำกับดูแลกิจการที่ดีในด้านต่าง ๆ เพื่อลดความผันผวนของอัตราผลตอบแทนในตลาด ให้เกิดประโยชน์สูงสุดต่อนักลงทุนและผู้มีส่วนได้เสียอื่นในตลาดทุน

คำสำคัญ: การกำกับดูแลกิจการ ดัชนีการกำกับดูแลกิจการ คุณลักษณะของคณะกรรมการบริษัท ความเสี่ยง ความเสี่ยงของบริษัท ตลาดเศรษฐกิจเกิดใหม่ ความเสี่ยงของบริษัทในตลาดหลักทรัพย์แห่งประเทศไทย

1. Introduction

Due to the prevalent agency problems and lack of good governance, accounting scandals have been exposed in various industries such as Enron, WorldCom, and Lehman Brothers. Emerging markets such as Thailand also experience similar accounting scandals as executives of Thai listed companies committed fraud and misreported financial statements. For instance, Energy Earth PCL's executives were accused by the Securities and Exchange Commission (SEC) of falsifying details of its actual level of indebtedness (Sangwongwanich, 2018). SEC also imposed fines on former executives of Inter Fareast Energy Corporation for insider trading. Specifically, they acknowledged firm's financial problems at one of the board meetings and sold their shares to cut loss from share devaluation (Sangwongwanich, 2018). Corporate governance (CG) is thus perceived as one important control mechanism to mitigate agency problems. Specifically, SEC regularly monitors CG quality of listed companies in the Stock Exchange of Thailand (SET) to promote CG standards and practices for Thai listed companies to the international level.

Several accounting and finance studies examine the association between CG characteristics and firm value (Brown & Caylor, 2009; Core, Holthausen & Larcker, 1999; Yermack, 1996). Another research stream examines CG and firm risk in various settings. Overall, an extant literature provides evidence that CG practices vary across nations and the difference is attributed to the institutional background development of the country (Anderson & Gupta 2009; Bhatt & Bhatt, 2017). As discussed in Cornelius (2005), country factor plays an important role in establishing the framework for CG practices. For example, investors of two companies with the same risk profile but domiciled in countries with contrasting legal and regulatory standards are likely to experience different consequences when certain CG components are weakened. Specifically, investors are better protected in a country with stronger enforced laws and regulations. CG practices in developed countries also tend to be stronger than those in the emerging countries (Cornelius, 2005). For instance, after the passage of Sarbanes-Oxley Act (SOX) and CG standards by the Stock Exchange and Commission (SEC), US firms have become more conservative (DeZoort, Hermanson & Houston, 2008). Relative to the developed markets, the application of CG practices is more recent in the emerging markets. Also, local protection laws are less effective than the US securities laws. These regulatory differences raised the question of whether CG standards applied in the emerging markets are as effective and beneficial to the investors and other stakeholders as in the developed markets.

Limited evidence of an association between CG and firm risk exists for firms in the emerging markets (Sayari & Marcum, 2018). Also, due to limited data availability, only certain CG attributes are examined (Koerniadi, Krishnamurti & Tourani-Rad, 2014; Mathew, Ibrahim & Archbold, 2018). As discussed

in Sayari and Marcum (2018), Thailand was ranked as one of the 22 best performing emerging markets for the year 2014 by Bloomberg Visual Data. Therefore, we believe that an investigation of CG and firm risk in this setting answers calls for more research in the emerging markets. Most research studies of Thai listed firms examine the relation between CG and firm financial performance, rather than firm risk. Nevertheless, shareholders are concerned with not only the size and growth in their investment, but also volatility in their returns, or firm risk (Mathew et al., 2018). Therefore, our study intends to fill the gap in the literature and ask whether an overall CG quality or a comprehensive set of CG characteristics is associated with firm risk.

Using a sample of non-financial SET listed firms, we find that an overall CG quality is negatively associated with firm risk. When examining a set of CG variables, we find that the proportion of independent board members, family ownership, board meeting attendance, audit committee meeting attendance, board compensation, and auditor quality are associated with firm risk reduction. Using our constructed CG index, we show that the higher level of CG index leads to lower firm risk. To sum up, our results confirm that enhanced monitoring and control mechanisms between the owners and management incentivize Thai listed firms to reduce their corporate risk.

Our study contributes to the literatures in agency theory, corporate governance, and firm risk. Specifically, the findings that CG quality is associated with firm risk reduction can be explained by the reduction in agency cost and information risk. In addition, this study utilizes both aggregate CG scores and a set of CG attributes to validate the results and provide insights into which specific CG attributes help reduce firm risk in Thailand. Due to limited data availability, we hand collect data and form a proprietary CG database of one emerging market that can be used to examine other aspects of CG and financial accounting attributes. Furthermore, our findings have practical implications for managers, regulators, and investors. First, managers are incentivized to follow good CG practices to lower idiosyncratic risk of their firms. Second, regulators can better monitor and enforce good CG practices and mechanisms to lower firm risk for SET listed firms. Finally, investors make more informed decisions as firms with enhanced governance practices face lower variability in stock returns.

The rest of this paper is organized as follows. Section 2 discusses literature review and research questions. Section 3 describes sample selection and research methodology. Empirical results and data analyses are discussed in Section 4. Conclusions are provided in Section 5.

2. Literature Review and Research Questions

2.1 Agency Theory

According to Jensen and Meckling (1976), an agency relationship occurs when the principal engages the agent to perform service on their behalf. The separation of ownership and control has the potential to create agency problems, resulting in agents using strategies to promote their self-interest to the detriment of principals (Fama & Jensen, 1983; Jensen & Meckling, 1976). The premise of principal-agent models is that a principal designs a compensation contract based on observable and enforceable performance measures to align the incentives of the agent with those of the principal (Bushman & Smith, 2001). Nevertheless, agency theory suggests that managers are likely to exhibit two undesirable behaviors such as being self-interested and opportunistic. These behaviors are consistent with what Friedman (1953) proposed that the owner is aware of the manager's opportunistic behavior but still needs to rely on the manager with business expertise to run business operations, which in turn will lead to lower firm value. Due to the agency problems and lack of good governance, accounting scandals have been exposed in various industries.

2.2 Corporate Governance in Accounting and Finance Literature

Corporate governance is defined as the governance of corporations and determining the activities in which corporations are properly engaged (Brown, Beekes & Verhoeven, 2011). Brown et al. (2011) provide a comprehensive review of accounting and finance literature on CG such as the role of CG on financial accounting information (Bushman & Smith, 2001) and the studies of CG in Asia (Claessens & Fan, 2002). While early studies of CG focus on one CG component, recent studies construct composite CG measures or employ proprietary CG indices (Bebchuk & Hamdani, 2009; Brown & Caylor, 2006; Larcker, Richardson & Tuna, 2007). The following section discusses CG characteristics that have been found to be associated with firm value or firm performance in various settings.

Board size represents the level of effectiveness in business management. Andres and Vellelado (2008) document the proper board size of 19 for large commercial banks. Yermack (1996) documents a negative relation between board size and firm value for the board size of 4–10 people and no relation for board size greater than 10. CEO duality which is defined as combining the roles of CEO and chairman of the board (Goergen Limbach & Scholz-Daneshgari, 2020). A study by Baliga, Moyer, and Rao (1996) show no significant difference in the operating performance of firms that change CEO duality status. In contrast, Rutledge, Karim, and Lu (2016) document a negative relation between CEO duality and firm performance for NASDAQ-100 firms.

Proportion of independent board members indicate the balance the power and authority of the board. Millstein and Macavoy (1998) find that the board independence is positively associated with economic profit. However, Andres and Vellelado (2008) show the board composition of executive directors and non-executive directors is associated with higher firm value relative to firms with a large number of independent directors. Proportion of female board members is also examined as female directors seem to make more detailed and informed decisions. Carter, Simkins, and Simpson (2003) and Krishnan and Park (2005) document a positive association between female board directors and firm performance. However, Abdullah, Ismail, and Nachum (2016) find the effect of female directors on firm value is moderated by firms' ownership characteristics.

Proportion of board equity ownership may affect decisions of board members to protect their interests in the firm. Firm performance is found to be improved when the board equity ownership is between 0% and 5%, declined when the board equity ownership reaches 25%, and gradually increased when exceeding 25% (Morck, Shleifer & Vishny, 1988). Empirical evidence from various countries such as western Europe, India and Indonesia show a positive impact of family ownership on firm value (Juwita, 2019; Pindado, Requejo & De La Torre, 2008; Srivastava & Bhatia, 2020). Chung and Zhang (2011) document a positive relation between institutional ownership and corporate governance due to the monitoring role of institutional investors. Prior studies find a positive relation between institutional ownership and firm performance in China and India (Kansil & Singh, 2018; Lin & Fu, 2017). Nonetheless, a study of Jordanian listed firms shows no relationship between institutional ownership and firm performance (AL-Najjar, 2015).

Board meeting attendance reflects the board members' perceptions to the importance of their roles and board meeting outcomes. Chou, Chung, and Yin (2013) and Buchdadi, Ulupui, Dalimunthe, Pamungkas, and Fauziyyah (2019) show board meeting attendance significantly improves company performance. Board compensation is another CG component that is found to be positively associated with subsequent financial firm performance (Muller, 2014). Similarly, Darmadi (2011) finds a positive relation between changes in board compensation and firm value in Indonesia. Audit committee is viewed as effective means for CG to reduce fraudulent financial reporting. Stewart and Munro (2007) find that audit committee meeting attendance is associated with a reduction in perceived audit risk of Australian auditors. Finally, auditor quality is found to be positively associated with firm performance in most CG studies as investors perceive higher quality and more reliable financial reports (Rahman, Meah & Chaudhory 2019; Olfa, 2019).

2.3 Corporate Governance in the Stock Exchange of Thailand

Good CG is crucial for listed companies in Thailand because it reflects the effective and transparent systems of firms, enhancing the confidence of investors and other stakeholders. Therefore, effective CG is seen as a tool to create firm value and promote long-term sustainability. SEC has placed an emphasis on monitoring CG quality of listed companies in the SET because this will help promote CG standards and practices for Thai listed companies to the international level. For these reasons, SEC issued the principles of good governance (CG code) for listed companies in 2006. (Corporate Governance Center, Stock Exchange of Thailand, 2006). Baselining corporate governance practices of Thai listed companies project was initiated in 2001 to survey the CG practices of listed companies to gain an understanding and use survey results as a guideline to develop and promote the principles of good CG. Thai Institute of Directors (IOD) has appointed representatives from various organizations as the Steering Committee to assess the survey criteria and provide feedback on the results. In addition, IOD conducts public seminars to present the survey results and the list of firms that have received good CG ratings (Thai Institute of Directors, 2020).

2.4 Corporate Governance and Firm Risk

One important factor that investors consider when making decision is investment risk. Risk represents uncertainty that the actual return will be lower than expected return. Two types of risk in the finance literature are (1) systematic risk that cannot be avoided due to uncontrollable external factors, and (2) unsystematic risk that affects only stock prices of one company or industry. Therefore, another research stream examines the effect of CG on firm risk in various settings. Using a sample of non-financial firms in the UK, Mathew et al. (2018) find a larger value of governance index is associated with lower firm risk. Pathan (2009) finds firm risk is negatively associated with board size and number of independent directors, but positively associated with CEO equity ownership. Cheng (2008) also finds the board size is negatively associated with variability of firm performance. Brick and Chidambaran (2008) examine board independence and find this to be negatively related to firm risk. Furthermore, CEO power is found to be positively related to firm risk (Lewellyn & Muller-Kahle, 2012). Using an index of CG, Koerniadi et al. (2014) find that well-governed New Zealand firms experience lower levels of risk. Furthermore, Sayari and Marcum (2018) examine emerging market firms and find that enhanced governance standards in emerging countries are generally associated with risk reductions.

Despite the overall findings of association between CG and firm risk, researchers discuss research limitations and suggest areas for future research. For instance, the CG index constructed in the study of Koerniadi et al. (2014) is rather arbitrary due to limitation of data availability. Mathew et al. (2018)

noted the lack of studies regarding the relation between CG and firm risk as the extant literature documents only certain attributes of CG are linked to the variability in performance. Furthermore, although the literature seems to suggest that effective CG leads to risk reduction, limited evidence exists for firms operating in the emerging markets (Sayari & Marcum, 2018).

2.5 Research Questions

Research studies show the more effective CG practices in developed countries help mitigate agency problems and increase firm value. One prominent example of developed markets is the US setting. Since the passage of SOX in 2002 and the imposed governance standards by the SEC, US firms have become more conservative in the post-SOX period (DeZoort et al., 2008). This is because SOX and CG mechanisms have enhanced the internal control and board oversight, strengthened role of audit committee, and reduced management risk-taking behaviors (Beasley, Carcello, Hermanson & Neal, 2009; Cohen, Krishnamoorthy & Wright 2010; Wang, 2010). Therefore, CG is deemed an important mechanism to protect minority shareholders and creditors from expropriation by managers and controlling shareholders (La Porta, Lopez-de-Silanes, Shleifer & Vishny, 2000). Nevertheless, it is unclear whether the role of CG in mitigating agency problems holds for firms in the emerging markets. As discussed in Sayari and Marcum (2018), shareholders in the emerging markets are perceived to be less protected because the application of CG rules is relatively a recent development in these markets and local protection laws are not as effective as US laws (Claessens & Yurtoglu, 2013). Therefore, it is an intriguing question to explore and understand whether CG rules applied in the emerging markets are also effective and beneficial to the investors and other stakeholders as in the developed markets.

Drawn upon literature review and the calls for research in emerging markets, we ask two research questions. First, prior literature documents a negative relation between CG and firm risk in other settings. Therefore, our first research question asks whether the overall CG quality of Thai listed firms is associated with firm risk reduction.

RQ1: Is the overall CG quality of Thai listed firms associated with firm risk?

After examining the effect of overall CG quality on firm risk for Thai listed firms, we believe it is important to also shed light on the role of individual CG components on firm risk in this setting. As individual CG components contribute to the overall CG quality, an understanding of which specific CG characteristics are associated with firm risk can potentially benefit interested stakeholders. Long-term investors are concerned with not only the size and growth in their investment, but also firm risk (Mathew et al., 2018). Therefore, investors benefit from the insights of individual CG characteristics

that can be taken into consideration when evaluating firm risk and their investment returns. Regulators can also better monitor listed firms and protect investors by enforcing or strengthening relevant CG characteristics to lower firms' variability in returns. Therefore, we examine a comprehensive set of CG characteristics and firm risk as a second research question. Because prior literature documents mixed evidence between CG characteristics and firm risk, it is unclear regarding the direction of association between each CG variable and firm risk in the Thai stock market. Hence, we examine this issue as a research question instead of directional hypothesis. Based on the literature review, the following CG characteristics are examined: board size, CEO duality, proportion of independent board members, proportion of female board members, board ownership, family ownership, institutional ownership, board meeting attendance, audit committee meeting attendance, board compensation, and auditor quality. Therefore, our second research question is as follows:

RQ2: Are the internal CG characteristics of Thai listed firms associated with firm risk?

3. Sample Selection and Research Methodology

3.1 Sample Selection

Our sample period spans for 5 years between 2015 and 2019 and we obtain data from various data sources. To begin with, we identify all listed firms in the SET market for a total of 544 firms (as of November, 2020). Then we exclude firms in the financial industry (47 firms). The remaining number of non-financial listed firms for hand-collected data is 497 firms. Next, we hand collect data of internal CG variables from the 56-1 annual reports. As for a proxy of the overall CG quality, we obtain CG score (CGS) directly from the Corporate Governance Report of Thai Listed Companies. After completing the hand-collected data process, there are 2,720 firm-year observations with available data of CG and firm risk variables. All control variables are obtained from SETSMART database. Our final sample consists of 1,962 firm-year observations over the period 2015–2019. Table 1 summarizes the sample selection process. All variables are defined in the Appendix.

Table 1 Sample Selection

Step 1:	
Number of firms listed in the SET market (as of November 2020)	544
Less: Number of firms in the financial industry	(47)
Remaining firms for hand collected data	497
Step 2:	
Firm-year observations with available data of	
(1) corporate governance related variables hand collected from 56-1 annual reports and Corporate Governance Report of Thai Listed Companies, and	
(2) Firm risk variables calculated from financial data obtained from SETSMART database	2,720
Less: Firm-year observations with missing control variables from SETSMART database	(758)
Final firm-year observations for analyses	**1,962**
(448 unique firms; 7 unique industries; 24 unique industry sub-sectors)	

Notes to Table 1:
The sample consists of firm-year observations during the period 2015–2019

3.2 Measurement of Firm Risk

Following prior literature (Mathew et al., 2018; Pathan, 2009), we use two proxies for firm risk as follows. The first risk measure (*RISK*) for main tests in section 4.2 represents total risk which includes both idiosyncratic risk that is specific to each firm and market risk (or systematic risk). As discussed in the literature, this risk is considered an important factor given that it is frequently monitored by regulators and managers. *RISK* is thus measured as standard deviation of natural logarithm of annualized daily stock returns. An alternative risk measure (*RISK2*) for robustness tests in Section 4.3 is asset return risk, which represents the variance of asset returns following Mathew et al. (2018). Variables are defined in the appendix.

3.3 Measurement of Corporate Governance Quality

Based on literature review, we use two main proxies for CG to test research questions. The first proxy is the overall CG score (CGS). We obtain CG scores from the Corporate Governance Report of Thai Listed Companies. Only firms that receive the CG scores of good, very good, and excellent (CG scores of 3–5) are published in each report. Firms not listed in these reports receive CG scores between 0 and 2. However, since public data are not available, we recoded the latter group as firms with CG score of 0. Original published CG scores that range from 3–5 were recoded to range from 1–3 for ease of interpretation and consistency. Therefore, CGS values range from 0–3.

While extant literatures uses either a composite CG score or a set of board attributes as a proxy for CG quality, we use a comprehensive set of internal CG attributes as the second proxy. These are not exhaustive list of all CG attributes. However, these variables represent multidimensional attributes of CG quality in Thai listed firms that cover more than the board attributes. The first four CG variables represent the board composition (*BOARDSIZE*, *CEODUAL*, *INDBOARD*, *FEMBOARD*) in which SET listed firms disclose the information publicly. Next, we examine three dimensions of ownership structure (*BOARDOWN*, *FAMOWN*, *INSOWN*) as Thai listed firms' ownership composition may include board, family, and/or institutional equity ownership. In addition, the percentage of meeting attendance out of all meetings held by the board and audit committees are examined (*BOARDMEET*, *AUDITMEET*). Board committee compensation (*BOARDCOMP*) is CG quality measure that reflects the incentive of board members to monitor firms' activities. Lastly, auditor quality (*BIG4*) is important for transparent financial reporting process. Due to limited proprietary database of CG variables in Thailand, we hand collect data of these CG variables from the 56-1 annual reports to form our own proprietary database and test RQ2.

3.4 Empirical Models

To test whether the CG characteristics of Thai listed firms are associated with firm risk, we use univariate analyses to examine the correlations between CG variables and firm risk. For both research questions, we use the following two linear regression models as multivariate analyses to examine the association between CG variables and firm risk. Specially, Equation (1) is used to examine the relation between the overall CG quality and firm risk (RQ1). Equation (2) is used to examine the relation between internal CG variables and firm risk (RQ2).

$$RISK_{i,t} = \alpha_0 + \alpha_1 CGS_{i,t} + \alpha_2 FSIZE_{i,t-1} + \alpha_3 LEV_{i,t-1} + \alpha_4 CFS_{i,t-1} + \alpha_5 ROA_{i,t-1} + IndustryDummy + YearDummy + \varepsilon_{i,t} \quad Eq.\ (1)$$

$$RISK_{i,t} = \beta_0 + \beta_1 BOARDSIZE_{i,t} + \beta_2 CEODUAL_{i,t} + \beta_3 INDBOARD_{i,t} + \beta_4 FEMBOARD_{i,t} + \beta_5 BOARDOWN_{i,t} + \beta_6 FAMOWN_{i,t} + \beta_7 INSOWN_{i,t} + \beta_8 BOARDMEET_{i,t} + \beta_9 AUDITMEET_{i,t} + \beta_{10} BOARDCOMP_{i,t} + \beta_{11} BIG4_{i,t} + \beta_{12} FSIZE_{i,t-1} + \beta_{13} LEV_{i,t-1} + \beta_{14} CFS_{i,t-1} + \beta_{15} ROA_{i,t-1} + IndustryDummy + YearDummy + \varepsilon_{i,t} \quad Eq.\ (2)$$

The main dependent variable is firm risk (*RISK*) and the main independent variables are the overall CG quality (*CGS*) or a set of internal CG variables in the current period. *BOARDSIZE* is the number of board committee members. *CEODUAL* or CEO duality is an indicator variable equals to 1 if the CEO is also the board president, and 0 otherwise. *INDBOARD* (*FEMBOARD*) is the percentage of total independent directors (female board members) to total number of board members. *BOARDOWN*, *FAMOWN*, and *INSOWN* represent the percentage of shares owned by board members, family members, and institutions, respectively. *BOARDMEET* (*AUDITMEET*) is the number of board committee (audit committee) meetings attended divided by total meetings held. *BOARDCOMP* is natural logarithm of board committee compensation.

Control variables are included following prior CG literature in accounting and finance. All control variables are in the lagged period (period t–1). *FSIZE* (natural logarithm of total assets) and *LEV* (total liabilities scaled by total assets) are included to control for firm size and financial leverage. Larger firms may have better access to capitals which result in less firm risk while firms with high financial leverage may be associated with less firm risk due to the burden of repayment (Cheng, 2008; Mathew et al., 2018). *CFS* (cash flow per share) and *ROA* (return on assets) are included to control for the potential effect of CG and firm risk (Koerniadi et al., 2014). All continuous variables are winsorized at the top and bottom 1% to minimize outlier issues. Fixed industry and year effects are included to control for unobserved heterogeneity.

4. Empirical Results and Analyses

4.1 Descriptive Statistics and Univariate Analyses

Table 2 provides descriptive statistics for CG variables, firm risk variables, and control variables included in the main regression models. Table 3 presents correlation coefficients of all variables. Examining the correlations reveals that the overall CG variables (*CGS*) are negatively associated with firm risk (*RISK*). In addition, *BOARDSIZE*, *INDBOARD*, *FAMOWN*, *BOARDMEET*, *AUDITMEET*, *BOARDCOMP*, and *BIG4* are negatively associated with firm risk. In other words, firms with higher level of these internal CG

characteristics experience lower variability in their returns. *FEMBOARD* is positively related to firm risk while *CEODUAL*, *BOARDOWN* and *INSOWN* are not associated with firm risk. Overall, univariate results suggest a negative correlation between most CG characteristics and firm risk. To address the potential multicollinearity issue between independent variables, we examine each correlation coefficient and find the highest positive (negative) coefficient is at 0.68 (–0.52). Therefore, multicollinearity is not an issue for the multivariate analyses discussed in Section 4.2.

Table 2 Descriptive Statistics (N = 1,962)

Variables	Mean	P25	Median	P75	Min	Max	Std.
RISK	0.03	0.02	0.02	0.03	0.01	0.19	0.03
CGS	1.52	1.00	2.00	2.00	0.00	3.00	1.05
BOARDSIZE	10.25	9.00	10.00	12.00	5.00	21.00	2.44
CEODUAL	0.31	0.00	0.00	1.00	0.00	1.00	0.46
INDBOARD	0.41	0.33	0.38	0.45	0.25	0.70	0.09
FEMBOARD	0.19	0.09	0.17	0.27	0.00	0.60	0.14
BOARDOWN	0.23	0.01	0.15	0.41	0.00	0.86	0.25
FAMOWN	0.26	0.00	0.21	0.46	0.00	0.84	0.26
INSOWN	0.35	0.07	0.28	0.61	0.00	0.97	0.30
BOARDMEET	0.90	0.88	0.94	0.97	0.00	1.00	0.13
AUDITMEET	0.84	0.90	1.00	1.00	0.00	1.00	0.31
BOARDCOMP	15.31	14.61	15.27	15.99	12.79	18.22	1.08
BIG4	0.67	0.00	1.00	1.00	0.00	1.00	0.47
FSIZE	15.67	14.54	15.46	16.60	13.09	19.97	1.50
LEV	0.15	0.03	0.10	0.25	0.00	0.54	0.14
CFS	0.00	0.00	0.00	0.00	–0.00	0.04	0.01
ROA	0.02	0.01	0.02	0.04	–0.13	0.11	0.03

Notes to Table 2:
See Appendix for variable definitions. All continuous variables are winsorized at the top and bottom 1%.

Table 3: Correlations

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 *RISK*	1																
2 *CGS*	**–0.25**	1															
3 *BOARDSIZE*	**–0.05**	**0.17**	1														
4 *CEODUAL*	–0.00	**–0.11**	–0.03	1													
5 *INDBOARD*	**–0.07**	**0.14**	**–0.21**	–0.03	1												
6 *FEMBOARD*	**0.09**	**–0.05**	**–0.12**	**0.05**	–0.00	1											
7 *BOARDOWN*	0.02	**–0.10**	**–0.11**	**0.25**	–0.03	**0.15**	1										
8 *FAMOWN*	**–0.05**	**–0.07**	**–0.16**	**0.22**	**0.06**	**0.16**	**0.59**	1									
9 *INSOWN*	–0.04	**0.22**	**0.28**	**–0.14**	**–0.11**	**–0.11**	**–0.39**	**–0.52**	1								
10 *BOARDMEET*	**–0.19**	**0.21**	–0.01	0.01	0.04	0.01	0.04	**0.08**	–0.01	1							
11 *AUDITMEET*	**–0.11**	**0.26**	**0.06**	**–0.04**	0.04	**–0.09**	–0.03	–0.01	**0.07**	**0.17**	1						
12 *BOARDCOMP*	**–0.24**	**0.41**	**0.41**	**–0.12**	0.02	**–0.16**	**–0.18**	**–0.18**	**0.34**	**0.09**	**0.10**	1					
13 *BIG4*	**–0.21**	**0.22**	**0.10**	–0.02	–0.02	**–0.13**	**–0.11**	**–0.15**	**0.32**	**0.06**	**0.05**	**0.29**	1				
14 *FSIZE*	**–0.27**	**0.42**	**0.36**	**–0.05**	**0.12**	**–0.21**	**–0.23**	**–0.19**	**0.35**	**0.07**	**0.13**	**0.68**	**0.34**	1			
15 *LEV*	**–0.13**	**0.22**	**0.19**	–0.04	**0.08**	**–0.09**	**–0.12**	**–0.08**	**0.13**	0.04	**0.08**	**0.36**	**0.19**	**0.56**	1		
16 *CFS*	**0.13**	**0.06**	**0.19**	**–0.05**	**0.05**	**–0.06**	**–0.08**	**–0.15**	**0.30**	–0.03	0.04	**0.21**	0.04	**0.22**	**0.05**	1	
17 *ROA*	**–0.13**	**0.13**	**0.07**	0.03	**–0.07**	0.02	**0.07**	**0.07**	**0.11**	**0.07**	0.02	**0.14**	**0.10**	**0.08**	–0.01	**0.20**	1

Notes to Table 3:
See Appendix for variable definitions. Bolded correlations are statistically significant at the 0.05 level.

4.2 Multivariate Analyses

Although Table 3 provides some preliminary insights into RQ1 and RQ2, we estimate linear regression models to test both research questions. Table 4 presents OLS regression results of Eq. (1) and Eq. (2) which examine whether an overall CG quality (RQ1) and a comprehensive set of internal CG characteristics (RQ2) are associated with firm risk. A coefficient on CGS in Model 1 is negative and statistically significant at the 0.01 level. Therefore, overall results suggest that the higher CG quality of Thai listed firms leads to firm risk reduction (RQ1). This is consistent with prior literature of CG and firm risk in other countries. An agency theory suggests that enhanced monitoring and control mechanisms between the owners and management incentivize firms to reduce their corporate risk (Sayari & Marcum, 2018). As for a set of internal CG attributes in Model 2, we find that coefficients on *INDBOARD*, *FAMOWN*, *BOARDMEET*, *AUDITMEET*, *BOARDCOMP*, and *BIG4* are all negative and statistically significant at the 0.05 or 0.01 level. That is, a higher proportion of independent board members reduces firm risk for Thai listed firms, consistent with extant literature in other countries. However, board size, CEO duality, and proportion of female board members are not associated with firm risk. In terms of ownership structure, we find only family ownership is associated with firm risk reduction. This finding suggests that higher percentage of family ownership can help mitigate the agency problems, similar to findings of family ownership and firm value in prior studies. Both board committee and audit committee meeting attendance lead to lower firm risk. This suggests that the members of both committees perceive the importance of their roles and the meeting outcomes, which in turn can reduce firm risk. Larger board committee compensation (*BOARDCOMP*) is found to also reduce firm risk. This could be attributed to the board's financial incentives to perform their monitoring roles of their firms. Finally, auditor quality is negatively associated with firm risk. This reflects that better quality of external auditors leads to more transparent financial reporting process that helps mitigate firm risk.

As for control variables, we find consistent results across both models. To be specific, we show larger firm size (*FSIZE*) reduces firm risk. This is because they have more resources to mitigate risk. However, firm leverage (*LEV*) is only marginally (not) associated with firm risk in Model 2 (Model 1). Cash flow per share (*CFS*) is found to be positively associated with firm risk. This suggests that firms engage in more risky projects in order to generate higher cash flows. Finally, return on asset (ROA) is negatively related to firm risk, suggesting that firms that can effectively utilize their assets to generate profits tend to experience lower firm risk. For all models in the multivariate analyses, we also use variance inflation factor (VIF) as a check for multicollinearity issue. A VIF value greater than 10 indicates a case of multicollinearity. However, we find that our computed VIF in all models are less than 3. Therefore, we validate that there is no multicollinearity issue in this study.

Table 4 Test of the Effect of Corporate Governance on Firm Risk

Variables	Model 1 (with *CGS* variable)		Model 2 (with Internal CG variables)	
	Coeff.	T-stats	Coeff.	T-stats
Intercept	0.099***	11.81	0.156***	15.52
CG Variables				
CGS	–0.003***	–4.59		
BOARDSIZE			0.000	0.47
CEODUAL			–0.001	–0.62
INDBOARD			–0.013**	–2.19
FEMBOARD			0.006	1.62
BOARDOWN			0.000	0.02
FAMOWN			–0.007***	–2.95
INSOWN			0.001	0.31
BOARDMEET			–0.023***	–4.36
AUDITMEET			–0.004***	–2.73
BOARDCOMP			–0.003***	–4.20
BIG4			–0.006***	–4.34
Control Variables				
FSIZE	–0.004***	–7.61	–0.003***	–4.35
LEV	0.008	1.63	0.009*	1.93
CFS	0.914***	5.39	0.882***	5.24
ROA	–0.115***	–6.33	–0.103***	–5.65
Number of obs	1,962		1,962	
R-squared	0.163		0.198	

Notes to Table 4:

This table presents OLS regression results of Equations (1) & (2).

$$RISK_{i,t} = \alpha_0 + \alpha_1 CGS_{i,t} + \alpha_2 FSIZE_{i,t-1} + \alpha_3 LEV_{i,t-1} + \alpha_4 CFS_{i,t-1} + \alpha_5 ROA_{i,t-1} + IndustryDummy + YearDummy + \varepsilon_{i,t} \quad Eq.\ (1)$$

$$RISK_{i,t} = \beta_0 + \beta_1 BOARDSIZE_{i,t} + \beta_2 CEODUAL_{i,t} + \beta_3 INDBOARD_{i,t} + \beta_4 FEMBOARD_{i,t} + \beta_5 BOARDOWN_{i,t} + \beta_6 FAMOWN_{i,t} + \beta_7 INSOWN_{i,t} + \beta_8 BOARDMEET_{i,t} + \beta_9 AUDITMEET_{i,t} + \beta_{10} BOARDCOMP_{i,t} + \beta_{11} BIG4_{i,t} + \beta_{12} FSIZE_{i,t-1} + \beta_{13} LEV_{i,t-1} + \beta_{14} CFS_{i,t-1} + \beta_{15} ROA_{i,t-1} + IndustryDummy + YearDummy + \varepsilon_{i,t} \quad Eq.\ (2)$$

Fixed industry and year effects are included and p-values are based on robust standard errors. *, **, ***: significant at 10%, 5%, 1% two-sided p-values. All continuous variables are winsorized at the top and bottom 1st and 99th percentile. All variables are defined in the Appendix.

4.3 Robustness Tests

In addition to the first risk measure (*RISK*), we estimate the same linear regression models using an alternative risk measure (*RISK2*) and report results in Table 5. Due to the additional variables required to compute *RISK2* variable, total number of observations has decreased slightly from 1,962 to 1,931 firm-year observations for all remaining tests using *RISK2* variable. Overall, results using an alternative risk measure are similar to the first risk measure but are less significant. For example, a coefficient on *CGS* is negative but marginally significant at the 0.10 level. When examining each of the 11 internal CG variables in Model 2, we find similar results with an exception of *AUDITMEET* variable. Therefore, using either the first or second risk measure as a dependent variable provide qualitatively similar results for Thai listed firms.

Table 5 Test of the Effect of Corporate Governance on Firm Risk (Alternative Risk Measure)

Variables	Model 1 (with *CGS* variable)		Model 2 (with Internal CG variables)	
	Coeff.	T-stats	Coeff.	T-stats
Intercept	0.981***	6.79	1.740***	7.24
CG Variables				
CGS	−0.036*	−1.70		
BOARDSIZE			−0.004	−0.85
CEODUAL			0.027	0.65
INDBOARD			−0.470**	−2.48
FEMBOARD			−0.000	−0.00
BOARDOWN			−0.074	−1.40
FAMOWN			−0.064**	−2.04
INSOWN			−0.034	−0.76
BOARDMEET			−0.298***	−2.62
AUDITMEET			0.041	1.63
BOARDCOMP			−0.031*	−1.77
BIG4			−0.086**	−2.28

Table 5 Test of the Effect of Corporate Governance on Firm Risk (Alternative Risk Measure) (Cont.)

Variables	Model 1 (with *CGS* variable)		Model 2 (with Internal CG variables)	
	Coeff.	T-stats	Coeff.	T-stats
Control Variables				
FSIZE	−0.038***	−4.05	−0.022	−1.48
LEV	−0.323**	−2.44	−0.303**	−2.31
CFS	26.171**	2.55	26.345**	2.50
ROA	−0.814*	−1.89	−0.660	−1.57
Number of obs	1,931		1,931	
R-squared	0.107		0.122	

Notes to Table 5:
This table presents OLS regression results of Equations (1) & (2) using an alternative risk measure (RISK2).

$$RISK2_{i,t} = \alpha_0 + \alpha_1 CGS_{i,t} + \alpha_2 FSIZE_{i,t-1} + \alpha_3 LEV_{i,t-1} + \alpha_4 CFS_{i,t-1} + \alpha_5 ROA_{i,t-1} + IndustryDummy + YearDummy + \varepsilon_{i,t} \quad Eq.\ (1)$$

$$RISK2_{i,t} = \beta_0 + \beta_1 BOARDSIZE_{i,t} + \beta_2 CEODUAL_{i,t} + \beta_3 INDBOARD_{i,t} + \beta_4 FEMBOARD_{i,t} + \beta_5 BOARDOWN_{i,t} + \beta_6 FAMOWN_{i,t} + \beta_7 INSOWN_{i,t} + \beta_8 BOARDMEET_{i,t} + \beta_9 AUDITMEET_{i,t} + \beta_{10} BOARDCOMP_{i,t} + \beta_{11} BIG4_{i,t} + \beta_{12} FSIZE_{i,t-1} + \beta_{13} LEV_{i,t-1} + \beta_{14} CFS_{i,t-1} + \beta_{15} ROA_{i,t-1} + IndustryDummy + YearDummy + \varepsilon_{i,t} \quad Eq.\ (2)$$

Fixed industry and year effects are included and p-values are based on robust standard errors. *, **, ***: significant at 10%, 5%, 1% two-sided p-values. All continuous variables are winsorized at the top and bottom 1st and 99th percentile. All variables are defined in the Appendix.

As a robustness test, we construct our own CG index using the comprehensive set of 11 internal CG variables to validate the association between CG quality and firm risk. Following Mathew et al., (2018) approach, we review CG literature to assign a value of 0 or 1 for each CG variable and combine all values into one CG index. The higher values of *BOARDSIZE*, *INDBOARD*, *FEMBOARD*, *BOARDMEET*, *AUDITMEET*, and *BOARDCOMP* generally indicate better CG. Thus, any values greater than the median value are assigned a value of 1, and 0 otherwise. *CEODUAL* value of 0 indicates different persons holding the CEO and board positions, and thus is assigned a value of 1 (better CG). For ownership structure, any values of *FAMOWN* and *INSOWN (BOARDOWN)* greater (lower) than the median value are assigned a value of 1. This is because prior literature documents the greater incentives to monitor firms' activities for family and institutional ownership, rather than board ownership. Finally, BIG4 value of 1 indicates better auditor quality and thus receives a value of 1. Therefore, our constructed CG index (CGI) ranges from 0–11. The higher values of *CGI* suggest better CG quality. We estimate the same linear regression model using *CGI* as the main test variable and present results in Table 6.

Consistent with results in Tables 4 and 5, the coefficients on CGI are negative and significant for both risk measures. To sum up, whether using the CG scores, a set of 11 CG variables, or our constructed CG index, we validate the results and reach the same conclusion that the better quality of CG is associated with firm risk reduction.

Table 6 Test of the Effect of Constructed Corporate Governance Index on Two Proxies of Firm Risk

Variables	Model 1 (Main DV of Firm Risk)		Model 2 (Alternative Measure of Firm Risk)	
	Coeff.	T-stats	Coeff.	T-stats
Intercept	0.106***	13.96	1.076***	9.02
CG Variables				
CGI	–0.002***	–4.72	–0.022*	–1.88
Control Variables				
FSIZE	–0.004***	–8.72	–0.039***	–4.60
LEV	0.008*	1.77	–0.315**	–2.45
CFS	0.959***	5.62	26.705**	2.54
ROA	–0.119***	–6.34	–0.845*	–1.89
Number of obs	1,962		1,931	
R-squared	0.161		0.107	

Notes to Table 6:
This table presents OLS regression results of Equation (1) using a constructed CG index (CGI).

$$RISK_{i,t}\,(RISK2_{i,t}) = \alpha_0 + \alpha_1 CGI_{i,t} + \alpha_2 FSIZE_{i,t-1} + \alpha_3 LEV_{i,t-1} + \alpha_4 CFS_{i,t-1} + \alpha_5 ROA_{i,t-1} + IndustryDummy + YearDummy + \varepsilon_{i,t} \quad \textit{Eq.}\ (1)$$

Fixed industry and year effects are included and p-values are based on robust standard errors. *, **, ***: significant at 10%, 5%, 1% two-sided p-values. All continuous variables are winsorized at the top and bottom 1st and 99th percentile. All variables are defined in the Appendix.

Annual general meeting (AGM) is considered one of the CG instruments that enables shareholders to hold the directors of the company accountable and contributes to the effective monitoring of management decisions (Apostolides, 2010; Stratling, 2003). Specifically, it provides useful information about the two-way communication process between managers and shareholders. Thai Institute of Directors, Thai Listed Companies Association, and the Stock Exchange of Thailand jointly initiated a project to assess the AGM quality for Thai listed companies. This suggests an important role of AGM in achieving good governance. Although the overall CG scores incorporate multidimensional aspects

of good CG practices, investors are likely to consider AGM quality when evaluating their investments and firm risk. Therefore, we use the quality of AGM scores (*AGM*) obtained from the Thai Investors Association's report of AGM quality assessment project as a secondary proxy of CG quality in the robustness test. Similar to CG scores, we recoded AGM scores to range from 0–3. Results are presented in Table 7 and are qualitatively similar to Table 4 results.

Table 7 Test of the Effect of Annual General Meeting Scores on Two Proxies of Firm Risk

Variables	Model 1 (Main DV of Firm Risk)		Model 2 (Alternative Measure of Firm Risk)	
	Coeff.	T-stats	Coeff.	T-stats
Intercept	0.108***	14.07	1.089***	9.23
CG Variables				
AGM	–0.002***	–3.06	–0.017*	–1.67
Control Variables				
FSIZE	–0.005***	–9.78	–0.046***	–6.66
LEV	0.009*	1.85	–0.312**	–2.44
CFS	0.917***	5.29	26.263**	2.53
ROA	–0.118***	–6.33	–0.863*	–1.89
Number of obs	1,962		1,931	
R-squared	0.155		0.104	

Notes to Table 7:

This table presents OLS regression results of Equation (1) using Annual General Meeting scores (AGM).

$$RISK_{i,t}\,(RISK2_{i,t}) = \alpha_0 + \alpha_1 AGM_{i,t} + \alpha_2 FSIZE_{i,t-1} + \alpha_3 LEV_{i,t-1} + \alpha_4 CFS_{i,t-1} + \alpha_5 ROA_{i,t-1} + IndustryDummy + YearDummy + \varepsilon_{i,t} \quad \textit{Eq.}\ (1)$$

Fixed industry and year effects are included and p-values are based on robust standard errors. *, **, ***: significant at 10%, 5%, 1% two-sided p-values. All continuous variables are winsorized at the top and bottom 1st and 99th percentile. All variables are defined in the Appendix.

To ensure that our results are not driven by a particular sub-group, we partition our sample into two groups based on the CG scores (*CGS*). Specifically, any firm-year observations with CG scores between 2 and 3 (0 and 1) are classified as a high (low) CG sub-group. Then we perform t-test of the differences in the mean value of each variable between the two groups. Table 8 presents results and confirms that the mean values of all variables from the two groups are statistically different, with an exception of *FAMOWN* and *CFS* variables.

Table 8 T-Test of High and Low CG Score Sub-Groups

Variables	Mean of Low CGS (n = 920)	Mean of High CGS (n = 1,042)	T-Stat of Mean Difference (assume equal variances)	T-Stat of Mean Difference (assume unequal variances)
CG Variables				
BOARDSIZE	9.883	10.578	−6.35***	−6.37***
CEODUAL	0.358	0.275	3.93***	3.91***
INDBOARD	0.401	0.418	−4.23***	−4.27***
FEMBOARD	0.194	0.182	1.85*	1.84*
BOARDOWN	0.253	0.216	3.37***	3.36***
FAMOWN	0.271	0.253	1.54	1.54
INSOWN	0.296	0.393	−7.28***	−7.28***
BOARDMEET	0.879	0.927	−8.12***	−7.87***
AUDITMEET	0.762	0.916	−11.21***	−10.85***
BOARDCOMP	14.907	15.659	−16.47***	−16.49***
BIG4	0.573	0.763	−9.15***	−9.06***
Control Variables				
FSIZE	15.159	16.131	−15.10***	−15.29***
LEV	0.127	0.173	−7.26***	−7.30***
CFS	0.002	0.003	−1.17	−1.17
ROA	0.020	0.027	−5.28***	−5.21***

Notes to Table 8:

All continuous variables are winsorized at the top and bottom 1st and 99th percentile. Low (High) CGS group consists of firm-year observations with a CG score of 0-1 (2-3). *, **, ***: significant at 10%, 5%, 1% two-sided p-values. All variables are defined in the Appendix.

5. Conclusion

Extant research shows the effect of enhanced corporate governance on firm risk reduction. Nonetheless, researchers note data limitations and call for more research in the emerging markets. Prior studies in both developed and developing countries focus more on the relation between CG and firm value, rather than firm risk. However, investors perceive and take into consideration idiosyncratic risk when making their investing decisions. Our study thus contributes to the literature by examining both the overall quality of national published CG scores and a set of CG attributes for Thai listed firms. Furthermore, we construct our own CG index to ensure that results are robust to all CG quality proxies. Therefore, our study is not limited to examining only one CG index or certain board attributes and shreds light on which specific internal CG characteristics of Thai listed firms can help mitigate firm risk. On the one hand, we document the overall CG quality leads to lower firm risk, confirming prior studies in other settings. On the other hand, when examining a set of internal CG attributes, we show certain CG variables are associated with firm risk reduction and some do not lead to firm risk. This is not a surprise given that prior literature in other countries also find mixed evidence. Therefore, future research may consider examining internal CG characteristics in other settings to reconcile inconclusive evidence in the literature. For instance, an investigation of CG and firm risk by industry, between listed and non-listed firms, or the moderating effect of financial variables on the relation between CG and firm risk.

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Appendix: Variable Definitions

Variables	Definitions
AGM	Annual General Meeting (AGM) scores are obtained from Thai Investors Association's report of AGM quality assessment project. Firms attaining rating of "Good", "Very Good", and "Excellent" (AGM scores of 3–5) are publicized. Firms with lower rating are not available and coded as 0. Original AGM scores of 3–5 are recoded to 1–3. AGM values range from 0–3.
AUDITMEET	Audit committee meeting attendance is calculated as the number of meetings attended divided by total meetings held.
BIG4	An indicator variable equals to 1 if the external auditor is Big 4, and 0 otherwise.
BOARDCOMP	Natural logarithm of sum of board committee compensation.
BOARDMEET	Board committee meeting attendance is calculated as the number of meetings attended divided by total meetings held.
BOARDOWN	Board ownership is percentage of shares owned by board members.
BOARDSIZE	Board size is the number of board committee members.
CEODUAL	CEO duality is an indicator variable equals to 1 if the CEO is also the board president, and 0 otherwise.
CFS	Cash flow per share is calculated as operating cash flows divided by total common shares.
CGI	CG index is constructed from the 11 CG attributes by assigning a value of 0 or 1 to each attribute based on literature review of good CG practices. CGI values range from 0–11.
CGS	CG scores are obtained from the Corporate Governance Report of Thai Listed Companies. Only firms that receive CG scores of "Good", "Very Good", and "Excellent" (CG scores of 3–5) are publicized. Firms with lower rating are not available and coded as 0. Original CG scores of 3–5 are recoded to 1–3. CGS values range from 0–3.
FAMOWN	Family ownership is percentage of shares owned by members of the family owner.
FEMBOARD	Percentages of total female board numbers to total number of board members.
FSIZE	Firm size is calculated as natural logarithm of total assets.
INDBOARD	Percentages of total independent directors to total number of board members.
INSOWN	Institutional ownership is percentage of shares owned by institutions.
LEV	Leverage is defined as total liabilities scaled by total assets.
RISK	Standard deviation of natural logarithm of annualized daily stock returns.

Variables	Definitions
RISK2	Ratio of market value of equity to market value of total assets multiplied by the standard deviation of annualized daily stock returns for a firm times the square root of trading days in the year which is 250.
ROA	Return on assets is calculated as EBITDA divided by total assets.