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Audit committees and systematic risk: Evidence from Taiwan's regulatory change

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ABSTRACT

This study examines the changes in the systematic risk of firms listed in the Taiwan stock market following the initial establishment of audit committees. While the results show that the changes in systematic risk are insignificant for the overall sample of firms, I do find that corporate governance influences the changes in systematic risk for the low-growth firms. Specifically, the low-growth firms with lower insider shareholdings, with a pyramidal ownership structure, not controlled by a family, or audited by one of the Big 4 accounting firms tend to enjoy the benefits of experiencing a decline in systematic risk following the establishment of the audit committee.

1. Introduction

Existing studies generally support the notion that the presence of an audit committee plays an important role in improving corporate governance. For example, it is helpful in reducing fraudulent financial reporting (Beasley, Carcello, Hermanson, & Lapides, 2000; Abbott, Parker & Peters, 2004); enhancing the quality of financial statements (DeFond & Jiambalvo, 1991; Dechow, Sloan, & Sweeney, 1996; Carcello & Neal, 2000; Klein, 2002); and reducing earnings management (Xie, Davidson, & DaDalt, 2003). In addition, prior work also documents that an audit committee having at least one member with financial expertise is more likely to perform its monitoring function well (Raghunandan, Rama, & Read, 2001; Davidson, Xie, & Xu, 2004). While there are numerous studies related to the audit committee, the question of whether or not the establishment of an audit committee leads to a decline in systematic risk is important but has not yet been answered. The main purpose of this study is to provide empirical evidence in response to this question.

Management has an incentive to pursue its own interests at the expense of shareholders when a separation of ownership and control exists, and this agency problem could negatively influence a firm's investment and other important decisions (Jensen & Meckling, 1976; Jensen, 1986). I consider an increase in systematic risk to be one of the negative influences arising from the suboptimal decisions that management make. The reason why the firm's systematic risk is so important is because an investor who constructs a well-diversified portfolio is only concerned with the systematic risk, as the firm's nonsystematic risk can be completely diversified out of the portfolio. How to ease the negative impacts associated with the agency problem has long been a central issue in finance, and enhancing the function of the audit committee is one of the important mechanisms used by firms to resolve the agency problem in the US and the UK.

There are two major characteristics of the literature on the audit committee. First, prior studies mainly examine the influence on the firm of appointing the members of the audit committee, or the influence on the firm of appointing a committee member with financial expertise. Second, prior research primarily investigates those firms in countries with a corporate-board structure based on

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the one-tier system, that is, the Anglo-American style. In contrast with existing studies, this paper investigates the impacts of the initial establishment of an audit committee on systematic risk for firms listed in the Taiwan stock market. The board structure of firms in Taiwan before 2006 was based on a two-tier system that consisted of separate boards of directors and supervisors. However, the revision of the Securities and Exchange Act in 2006 required that both firms in the financial sector and large firms establish an audit committee to replace the existing system of supervisors. As a consequence, the firms I investigate switched their board structures from a two-tier system to a one-tier system in response to the revision of the Securities and Exchange Act. That is, I examine the impact of the establishment of an audit committee due to regulatory change on a firm's systematic risk.

This study contributes to the literature in three ways. First, it focuses on the issue of the relationship between the audit committee and systematic risk that, while recognized to be important, has not yet been addressed. Secondly, it examines the firm's initial establishment of the audit committee as a whole rather than the appointment of individual committee members, or the influence of committee members with financial expertise. Third, this study investigates the establishment of audit committees by firms due to regulatory change as opposed to firms with an audit committee in a typical one-tier-system country.

According to the revision of the Securities and Exchange Act in 2006, an audit committee is required to be independent and professional, and all of the important corporate policies need to be monitored by the audit committee before proceeding. Therefore, it is considered to be a better mechanism for monitoring management than the prior system of supervisors. I therefore conjecture that the initial establishment of an audit committee is likely to reduce a firm's systematic risk. On the one hand, management will be less likely to make suboptimal decisions that pursue its own benefits instead of the shareholders' interests under the strengthened monitoring function exercised by the audit committee, and as a result the firm may be less likely to experience losses arising from those decisions. On the other hand, as the firm can be monitored more effectively, the investors' confidence in the firm could also be enhanced following the establishment of the audit committee and investors may also be less likely to sell their stock based on daily news about temporary economic fluctuations. Therefore, the stock's price could become more stable and experience less systematic risk following the event.

In a departure from studies concerned with the influence of the appointment of individual committee members, or the composition of an audit committee for firms in a one-tier-system country, I consider that the initial establishment of an audit committee could exert a more fundamental influence on the monitoring function of the board of directors. If an audit committee could help reduce the agency problem, and consequently reduce the firm's systematic risk, I consider that the initial establishment of an audit committee will be more likely to be beneficial. This study, therefore, examines the initial establishment of an audit committee in the case of firms listed in the Taiwan stock market. While the issue might not be appropriate when examined in the context of a one-tier-system country where the audit committee has existed for a long period of time, Taiwan's regulatory change provides a unique and natural setting for examining it.

As corporate governance could influence the agency problem and, consequently, influence a firm's systematic risk, I therefore investigate the influence of corporate governance on the changes in systematic risk following the establishment of an audit committee. In addition, prior studies document that a firm's systematic risk is positively related to its growth opportunities (Chung & Charoenwong, 1991; Carlson, Fisher, & Giammarino, 2004). I further investigate the influences of corporate governance on the changes in risk for both high- and low-growth firms, respectively.

The results show that the systematic risk does not change following the establishment of an audit committee, and most of the corporate governance variables do not influence the change in risk for the overall sample of firms. The results, however, do show that the systematic risk experiences a significant decline following the establishment of the committee in the case of certain low-growth firms. Why do the benefits from reducing systematic risk only exist within certain low-growth firms instead of high-growth firms? I consider that the phenomenon might be related to the agency problem of overinvestment (Jensen, 1986). That is, the low-growth firms will be more likely to overinvest and, as a result, the monitoring function of an audit committee could prove more helpful in reducing the possibility of making suboptimal investment decisions and in reducing the risk accompanying such decisions on the part of those firms. With this in mind, what kinds of low-growth firms are more likely to benefit from a decline in risk? This research finds that corporate governance has a significant influence on the changes in risk for low-growth firms following the establishment of an audit committee. Specifically, low-growth firms with smaller insider shareholdings, with a pyramidal ownership structure, and which are not controlled by a family or audited by one of the Big 4 accounting firms will tend to experience a significant decline in systematic risk following the initial establishment of an audit committee.

2. Institutional background: the development of the audit committee in Taiwan

There are two major styles of corporate-board structure, namely, the Anglo-American style (a one-tier system) and the German style (a two-tier system). The board structure in Taiwan generally follows the two-tier system, and can be regarded as a modified version of the German board structure. In Taiwan, the supervisors do not perform their duties collectively as a board as do their German or Japanese counterparts, and instead perform their duties individually. While the supervisors are responsible for monitoring the firm's business and for assessing the performance of the board of directors and management, they have no right to vote in the board meeting. In addition, as the Economic Daily News in Taiwan reported on December 22, 2017, the authorities consider that the supervisors could be relatives or close friends of the management, directors, or controlling shareholders. As a consequence, they are less likely to perform their duties effectively and are usually viewed as a rubber stamp in corporate governance. Therefore, the president of the Taiwan Corporate Governance Association, in an article published in the Economic Daily News on April 25, 2017, argues that Taiwan's listed companies should establish audit committees to replace their boards of supervisors.

To improve corporate governance, Taiwan's legislature revised the Securities and Exchange Act in 2006, thereby requiring firms

Table 1
Key differences between audit committees and the system of supervisors.

	Audit committees	Supervisors
The degree of independence requirements	High	Low
The degree of professionalism requirements	High	Low
Mandatory oversight of corporate policies	Yes	No

in the financial sector and also large firms with over NT$ 50 billion (US $ 1.66 billion) in equity, other than financial institutions, to establish audit committees to replace the existing system of supervisors. In 2011, the regulations further required that those firms with over NT$ 10 billion (US $ 0.33 billion) in equity establish an audit committee. It is expected that the regulations will further require that all listed firms with over NT$ 2 billion (US $ 0.06 billion) in equity establish an audit committee by 2019.

Since 2006, the number of firms listed in the Taiwan stock market that have established audit committees to replace the system of supervisors has been increasing. That is, more and more firms have been forced to adopt the one-tier system to replace their previous two-tier system because of the changes in the law. To strengthen the independence and functionality of the audit committee, the Securities and Exchange Act also requires that the audit committee be composed of only independent directors, that it should not be made up of less than three persons, and that at least one of them should have accounting or financial expertise. Compared to the prior system of supervisors, the newly-established audit committee should be more independent and professional, and therefore is to be regarded as a better mechanism for monitoring management and corporate policies.

In addition, under the prior system of supervisors, important corporate decisions did not have to be approved by the supervisors before being implemented. However, under the revised Securities and Exchange Act, nearly all important corporate decisions, including asset or derivative transactions, raising capital or financing decisions, the adoption or amendment of an internal control system, or the appointment or dismissal of a financial or auditing officer, need to be monitored by the audit committee prior to implementation. In short, compared with the system of supervisors, the exercise of oversight for corporate policies by the audit committee is much more mandatory and, therefore, more effective. Table 1 summarizes the key differences between audit committees and the system of supervisors. While Lee (2014) reports that Taiwan listed companies with supervisors perform better than such firms with audit committees, I consider it would be important to investigate the changes in systematic risk following the establishment of the audit committee.

3. Literature review

3.1. The impact of corporate governance on systematic risk

In order for a firm to avoid taking excessive risks, corporate governance has an important role to play in the firm's risk management, especially in the case of large financial institutions. Pais and Stork (2013) find that large banks tend to have higher systematic risk, and Aebi, Sabato, and Schmid (2012), in examining the risk management-related corporate governance mechanisms of banks, document that it would be better for the chief risk officer to directly report to the board of directors and not the CEO.

However, the relationship between corporate governance and corporate risk-taking could be mixed (John, Litov, & Yeung, 2008; Jiraporn, Chatjuthamard, Tong, & Kim, 2015). On the one hand, as managers have their human capital and even a large portion of their wealth tied up in the firm, due to career concerns, they may have an incentive to avoid taking risks, and that might result in corporate decisions that are less risky (Smith & Stulz, 1985). In addition, a firm with weaker corporate governance tends to impose fewer restrictions on managers, and therefore gives managers more room in making corporate decisions to pursue risk-aversion for their own interests. Consequently, firms with weaker corporate governance tend to be characterized by lower risk-taking. For example, Pathan (2009) finds that banks with a board that more significantly reflects the shareholders' interests tend to take greater risks, suggesting that board structure plays an important role in the risk taking of a firm.

On the other hand, King and Wen (2011) find that corporate governance has a significant influence on how management makes investment decisions. Furthermore, managers in firms with weaker governance mechanisms tend to have more freedom in making decisions, but they are also more likely to make less balanced decisions (Jiraporn et al., 2015). Such extreme decisions could make corporate performance more uncertain and also increase the risk to the firm (Adams, Almeida, & Ferreira, 2005). Based on this view, a firm with stronger corporate governance tends to take fewer risks (Jiraporn et al., 2015). Besides, Anginer, Demirguc-Kunt, and Zhu (2014) find that the higher systematic risk faced by banks that arises from a lack of competition can be mitigated by a strong institutional environment with efficient monitoring.

3.2. The important role of the audit committee

To strengthen corporate governance, the importance of establishing an effective audit committee has been increasingly recognized in the aftermath of various financial collapses around the world. The primary functions of the audit committee are to oversee a firm's financial reporting process, and to monitor its audit process and internal control systems. Firms with more severe agency problems tend to lower their agency costs by engaging in increased monitoring activity through audit committees (Menon & Williams, 1994).

Prior studies (DeFond & Jiambalvo, 1991; Dechow et al., 1996; Carcello & Neal, 2000; Klein, 2002) document that the existence of an audit committee is positively related to the quality of financial statements. In particular, fraudulent financial reporting is less likely to take place when the audit committee consists of at least one member with financial expertise (Beasley et al., 2000; Abbott et al., 2004).

While Peasnell, Pope, and Young (2005) find no evidence that the presence of an audit committee influences the extent of earnings management, Xie et al. (2003) note that audit committee members with financial backgrounds are helpful in reducing earnings management. In addition, to improve the effectiveness of the corporate audit committee, a committee with at least one member having an accounting or finance background is also more likely to oversee the process and results of internal auditing (Raghunandan et al., 2001).

The relationship between the existence of the audit committee and the audit fee could be mixed. On the one hand, to enhance audit quality, the audit committee should ensure that audit hours will not be reduced and the firm may therefore be expected to increase audit fees. On the other hand, the existence of an audit committee is helpful in improving internal controls and, as a result, a firm with an audit committee is expected to pay a lower audit fee than those firms without such a committee. Collier and Gregory (1996) find that the presence of an audit committee is effective in preventing a reduction in the audit fee thereby compromising the quality of the audit.

Prior studies (Davidson et al., 2004; Choi, Han, & Lee, 2014) also provide evidence that stock prices generally increase with the appointment of directors to the audit committee, in particular when new members of audit committees have financial expertise (Davidson et al., 2004). However, DeFond, Hann, and Hu (2005) find that stock prices only increase with the appointment of accounting financial experts assigned to audit committees, but do not increase with non-accounting financial experts assigned to audit committees.

3.3. Ownership structure, family-controlled firms, and the Big 4 accounting firms

Jensen and Meckling (1976) argue that managers tend to act according to their own self-interest when the firm's control and ownership are separated, which might result in a decline in corporate value. Therefore, the relationship between ownership structure and corporate value has been a central issue in the finance literature. Prior studies (Jensen & Meckling, 1976; Mueller & Spitz-Oener, 2006; Chen, Guo, & Mande, 2003) document that increasing the insider shareholdings is one of the important mechanisms that could be helpful in easing agency problems. McConnell and Servaes (1990) and Claessens, Djankov, Fan, and Lang (2002) also provide evidence that insider shareholdings are positively related to corporate value, which is consistent with the incentive effect of Jensen and Meckling (1976).

As the agency problem of overinvestment tends to be more severe in a low-growth firm (Jensen, 1986), and suboptimal investment decisions could also increase the risk to the firm (Adams et al, 2005), I consider that low-growth firms with lower insider shareholdings are more in need of being monitored by an audit committee to lessen their risk-taking associated with overinvestment.

La Porta, Lopez de Silanes, Shleifer, and Vishny (1999) argue that firms with a pyramidal ownership structure are more likely to allow controlling shareholders to pursue their own interests at the expense of minority shareholders. That is, the controlling shareholders in these firms have the power to expropriate the minority shareholders, as well as an interest in so doing. Prior studies (Claessens et al., 2002; Smith, Amoako-Adu, & Kalimipalli, 2009) document that the impact of the pyramidal structure on corporate value tends to be negative. In addition, Liu and Pang (2009) report that agency problems associated with the pyramidal ownership structure could be responsible for the misallocation of internal funds.

As a pyramidal ownership structure could weaken a firm's governance (La Porta et al., 1999), management in a firm with a pyramidal structure would be more likely to result in less balanced decisions and increase the risk to the firm (Adams et al., 2005; Jiraporn et al., 2015). I therefore consider that low-growth firms with a pyramidal ownership structure have a greater need to be monitored by an audit committee to reduce the additional risk that accompanies less balanced decisions.

In a family-controlled firm, management may be more likely to act for the controlling family but not for the shareholders in general (Morck & Yeung 2003), and to be unchallenged by other shareholders (La Porta et al., 1999). Besides, La Porta et al. (1999) argue that family control also facilitates corruption because it gives the controlling shareholders enormous autonomy in decision making. Since a family-controlled firm is more likely to have a lower level of board independence (Setia-Atmaja, Tanewski, & Skully, 2009), it tends to have a higher cost of equity (Boubakri, Guedhami, & Mishra, 2010). The empirical evidence (Lausten, 2002) also shows that a poorly-performing CEO in a family-controlled firm is less likely to be dismissed, and thus the relationship between CEO turnover and firm performance could be weakened in a family-controlled firm.

As the board's independence tends to be weakened in a family-controlled firm, and efficient monitoring is helpful in reducing systematic risk (Anginer et al., 2014), I therefore consider that the function of an audit committee could also be compromised in a low-growth, family-controlled firm. In other words, a low-growth, family-controlled firm may be less likely to lead to a decrease in risk following the establishment of the audit committee.

Existing studies (DeAngelo, 1981; Palmrose, 1988) document that large accounting firms tend to be more independent since no single client is all that important to them and they have a greater incentive to protect their reputation. While Big 4 accounting firms tend to charge higher audit fees (Simunic, 1980), their involvement also implies that the audit is of higher quality either due to the greater expertise of the auditor or additional audit effort (DeFond et al., 2000; Ferguson, Francis, & Stokes, 2003), so that firms with weaker internal monitoring would be in greater need of sound external monitoring by Big 4 accounting firms. Empirical work generally supports the view that Big 4 accounting firms provide higher quality audits or exhibit greater accuracy (Francis & Krishnan, 1999; Lennox, 1999; Weber & Willenborg, 2003). As a result, the earnings surprises of Big 4 auditing firms tend to be valued more

highly by the stock market (Teoh & Wong, 1993). Related studies also show that firms accompanied by a greater agency problem have a greater need to monitor their managers, and are therefore more likely to use Big 4 accounting firms (Francis & Wilson, 1988; DeFond, 1992; Francis & Krishnan, 1999).

I therefore consider that an audit committee could play a more effective role and could be more helpful in reducing the higher systematic risk accompanied by less balanced decisions (Adams et al., 2005; Anginer et al., 2014) when a low-growth firm is audited by one of the Big 4 accounting firms.

4. Sample and methodology

This study examines the changes in systematic risk when firms switched their board structure from a two-tier system to a one-tier system in response to Taiwan's regulatory change in 2006. The research period is 2006–2014, and the sample includes 213 firms listed in the Taiwan stock market that established an audit committee for the first time. The information regarding the establishment of an audit committee is gathered from the Market Observation Post System on the Taiwan Stock Exchange, and the required financial and corporate governance information is collected from the Taiwan Economic Journal, the most widely-used financial research database in Taiwan.

To examine whether or not there are changes in systematic risk following the establishment of an audit committee, by using daily stock returns, this paper employs the CAPM to measure the firm's systematic risk, and examines the changes in risk over a period of three years after the establishment of the audit committee and three years before it. The risk-free rate in the CAPM model is proxied by the 1-month rate of the Bank of Taiwan. After exploring the changes in risk for the overall sample of firms, I further investigate the influences of corporate governance on the changes in risk. The variables for corporate governance examined in this study comprise the insider shareholdings, the pyramidal ownership structure, the family-controlled firm, and the Big 4 accounting firms. The regression model is as follows:

$$\mathrm{CNGRISK_i} = \alpha + \beta_1 \mathrm{INSS_i} + \beta_2 \mathrm{PYR_i} + \beta_3 \mathrm{FAMF_i} + \beta_4 BIG4_i + \beta_5 CRISIS_i + \beta_6 FIN_i + \beta_7 VOL_i + \beta_8 SIZE_i + \beta_9 LEV_i + \mathrm{e_i} \quad (1)$$

where CNGRISK represents the change in systematic risk which is measured by the systematic risk over a period of three years after the establishment of the audit committee minus the systematic risk over a period of three years before it. INSS represents the insider shareholdings measured either by the percentage of shares held by the controlling shareholder or by all insiders including directors, supervisors, and managers. PYR represents the pyramidal ownership structure, which is a dummy variable that is assigned a value of 1 if the firm has a pyramidal ownership structure, and 0 otherwise. A firm's ownership structure is pyramidal if the controlling shareholder exercises control through at least one publicly-traded company (La Porta et al., 1999). FAMF represents the family-controlled firm, and is a dummy variable that is assigned a value of 1 if more than a third of the firm's directors are family members and 0 otherwise. BIG 4 represents the Big 4 accounting firms, and is a dummy variable that is assigned a value of 1 if the firm's financial statements are audited by one of the Big 4 accounting firms and 0 otherwise. CRISIS is a dummy variable that is assigned a value of 1 if a firm established its audit committee during the financial crisis of 2007–2008 and 0 otherwise. FIN is a dummy variable that is assigned a value of 1 if a firm is in the financial sector and 0 otherwise. VOL is also a dummy variable that is assigned a value of 1 if a firm established its audit committee voluntarily and 0 otherwise. SIZE represents firm size that is measured by the natural log of equity market value. LEV represents the relative leverage that is measured by the firm's debt ratio minus the average debt ratio of the industry, and the debt ratio is defined by the total debt divided by the total assets.

Table 2 presents the descriptive statistics for the corporate governance and control variables. The table shows that the average percentages of shares held by the controlling shareholder and by all insiders are 29.2 and 24.0 percent, respectively, indicating the existence of a significant separation between ownership and control. It also shows that 39.9 percent of sample firms are characterized

Table 2
Descriptive statistics.

	Mean	Median	Min	Max	Standard deviation
Shares held by controlling shareholders	29.286	27.58	1.09	89.08	19.092
Shares held by all insiders	24.030	20.41	1.58	81.47	17.962
Pyramidal ownership structure	0.399	0	0	1	0.490
Family-controlled firm	0.035	0	0	1	0.186
Big 4	0.771	1	0	1	0.420
Firm size	16.039	15.932	12.52	20.39	1.579
Leverage	0.408	0.760	−41.99	44.57	16.946
Voluntary adoption	0.735	1	0	1	0.415

The shares held by controlling shareholders and shares held by all insiders represent the percentages of shares held by the controlling shareholder and all insiders including directors, supervisors, and managers, respectively. The pyramidal ownership structure is a dummy variable and is assigned a value of 1 if the firm has a pyramidal ownership structure and 0 otherwise. The family-controlled firm is a dummy variable that is assigned a value of 1 if more than a third of the firm's directors are family members and 0 otherwise. Big 4 represents the Big 4 accounting firms, and is a dummy variable that is assigned a value of 1 if the firm's financial statements are audited by one of the Big 4 accounting firms and 0 otherwise. Firm size is measured by the natural log of equity market value. Leverage represents the relative leverage that is measured by the firm's debt ratio minus the average debt ratio for the industry, and the debt ratio is defined by the total debt divided by the total assets. Voluntary adoption is a dummy variable that is assigned a value of 1 if the firm establishes its audit committee voluntarily and 0 otherwise.

Table 3
Description of the sample.

Panel A: The market shares of the Big-4 accounting firms and the Percentages of voluntary adoption

Accounting firm	Market share	Percentage of voluntary adoption	Percentage of non-voluntary adoption
Deloitte	39.04%	70.73%	29.27%
PricewaterhouseCoopers	27.62%	74.13%	25.87%
Ernst & Young	18.57%	71.79%	28.21%
KPMG	14.76%	70.97%	29.03%

Panel B: The number of sample firms across industries

Industry	Number of observations
Computer and information technology	122
Finance	24
Electric machinery	6
Chemical, biotechnology and medical care	18
Textile	6
Food	2
Cement	1
Paper and pulp	3
Iron and steel	5
Shipping and transportation	4
Tourism	4
Plastic	6
Rubber	1
Building material and construction	4
Trading and consumers' goods	5
Oil, gas and electricity	1
Glass and ceramic	1
Other	10
Total	223

by a pyramidal ownership structure, and that only 3.5 percent of sample firms are controlled by the family. Finally, while price competition might prevail throughout the market for the audits of publicly-held companies (Simunic, 1980), the table shows that 77.1 percent of the sample firms' financial statements are audited by one of the Big 4 accounting firms, indicating that there is a significant preference among Taiwan listed firms for being audited by large accounting firms.

Table 3 Panel A shows that Deloitte enjoys the largest market share among the Big 4 accounting firms in the Taiwan stock market of 39.04%, followed by PricewaterhouseCoopers. Panel A also shows that there are no significant differences in the percentages of voluntary adoption of the audit committee among the Big 4 accounting firms. Panel B indicates that more than half of the firms in the sample are in the computer and information technology industry, which is in line with the industry structure of the Taiwan stock market. Besides, firms in the financial sector also account for more than 10% of the sample.

5. Empirical results

Table 4 examines whether or not the firm's systematic risk changes following the initial establishment of an audit committee. Systematic risk $(+1)$-(-1), Systematic risk $(+2)$-(-2) and Systematic risk $(+3)$-(-3) represent the changes in the firm's systematic risk, which are measured by the systematic risk over a period of 1 year, 2 years, and 3 years after the initial establishment of an audit committee minus the systematic risk over a period of 1 year, 2 years, and 3 years before it, respectively. Panel A shows that the means of Systematic risk $(+1)$-(-1), Systematic risk $(+2)$-(-2) and Systematic risk $(+3)$-(-3) are all statistically insignificant, indicating that a firm's systematic risk does not change significantly following the establishment of an audit committee for the overall sample of firms.

I further divide the sample firms into two groups based on whether or not a firm's audit committee was established during the financial crisis of 2007–2008. The results in Panels B and C show that neither group experiences a significant change in systematic risk. In addition, I also categorize the sample firms into two groups based on whether or not a firm is in the financial sector. While the firms that are not in the financial sector do not experience a change in systematic risk (Panel E), those in the financial sector do enjoy a reduction in such risk (Panel D).

While the audit committee could enhance the monitoring function of the board of directors and could be helpful in reducing the firm's risk resulting from making a suboptimal decision associated with the agency problem, I conjecture that the possible benefits from establishing an audit committee could vary from firm to firm, as corporate governance could differ across firms. Therefore, this paper investigates the influences of corporate governance on changes in systematic risk following the establishment of an audit

Table 4
Influence of the formation of an audit committee on a firm's systematic risk.

Panel A: Overall sample of firms			
	N	Mean	t
Systematic risk (+1)-(−1)	223	0.024	0.845
Systematic risk (+2)-(−2)	223	0.023	1.001
Systematic risk (+3)-(−3)	223	0.006	0.277
Panel B: Firms establishing their audit committee during the 2007–2008 financial crisis			
	N	Mean	t
Systematic risk (+1)-(−1)	6	−0.508	−0.815
Systematic risk (+2)-(−2)	6	−2.443	−1.368
Systematic risk (+3)-(−3)	6	−2.001	−1.37
Panel C: Firms not establishing their audit committee during the 2007–2008 financial crisis			
	N	Mean	t
Systematic risk (+1)-(−1)	217	0.084	1.226
Systematic risk (+2)-(−2)	217	0.081	1.213
Systematic risk (+3)-(−3)	217	0.063	0.937
Panel D: Firms in the financial sector			
	N	Mean	t
Systematic risk (+1)-(−1)	24	−0.017	−0.256
Systematic risk (+2)-(−2)	24	−0.104	−2.061*
Systematic risk (+3)-(−3)	24	−0.186	−3.428***
Panel E: Firms other than those in the financial sector			
	N	Mean	t
Systematic risk (+1)-(−1)	199	0.096	1.304
Systematic risk (+2)-(−2)	199	0.107	1.466
Systematic risk (+3)-(−3)	199	0.098	1.347

Note: * and *** represent significance levels of 10% and 1% based on a two-tailed test, respectively.
The sample in this study includes 223 events regarding the initial establishment of the audit committee by 223 listed firms in Taiwan. Systematic risk (+1)-(−1), Systematic risk (+2)-(−2) and Systematic risk (+3)-(−3) represent the systematic risk over a period of one year, two years, and three years after the initial establishment of the audit committee minus the systematic risk over a period of one year, two years, and three years before it, respectively.

committee in Table 5. The dependent variable in Table 5 is Systematic risk (+3)-(−3), that is, the change in systematic risk measured by the systematic risk over a period of three years following the establishment of an audit committee minus the systematic risk over a period of three years before it. The independent variables comprise both the corporate governance variables and the control variables, including whether or not a firm establishes its audit committee during the financial crisis of 2007–2008, whether or not a firm is in the financial sector, whether or not a firm establishes its audit committee voluntarily, the firm's size and leverage. As some firms have missing data for their independent variables, the number of firms investigated in the regression analysis is therefore reduced to 201.

As shown in Table 5, the coefficient of the shares held by all insiders is significantly positive, suggesting that firms with lower insider shareholdings are more likely to reduce their systematic risk. However, since most of the variables related to corporate governance are not significant, I therefore further investigate which firms would be more likely to enjoy the benefits of reducing risk following the establishment of an audit committee.

Dechow, Sloan, and Soliman (2004) decompose a firm's beta into its beta of assets-in-place and its beta of growth, and find that the beta of growth opportunities is greater than the beta of assets-in-place. Carlson et al. (2004) further document that the firm's systematic risk exhibits a linear relationship with the ratio of growth opportunities to assets in place. Furthermore, Chung and Charoenwong (1991) provide empirical evidence that a positive relationship exists between the firm's systematic risk and its growth opportunities. This study, as a result, examines whether or not the influences of corporate governance on the changes in risk would be different for firms with different growth opportunities.

Table 6 investigates the impacts of the insider shareholdings and growth opportunities on the changes in risk following the establishment of the audit committee. The insider shareholdings are either measured by the percentage of shares held by the controlling shareholder or by all insiders. The growth opportunities are measured by the ratio of the assets' market value to the book

Table 5
Influence of corporate governance on changes in systematic risk following the establishment of the audit committee.

	Model 1	Model 2
	Dependent variable	Dependent variable
	Changes in systematic risk	Changes in systematic risk
Constant	−0.023	−0.216
	(−0.020)	(−0.196)
Shares held by controlling shareholders	0.006	
	(1.525)	
Shares held by all insiders		0.012
		(2.804)***
Pyramidal ownership structure	0.076	0.054
	(0.474)	(0.343)
Family-controlled firm	−0.007	0.052
	(−0.019)	(0.133)
Big 4	0.060	0.052
	(0.347)	(0.304)
Crisis	0.253	0.247
	(0.579)	(0.576)
INDFIN	−0.228	−0.247
	(−0.803)	(−0.881)
Voluntary adoption	0.082	0.035
	(0.315)	(0.135)
Firm size	−0.014	−0.005
	(−0.226)	(−0.083)
Leverage	−0.005	−0.006
	(−1.041)	(−1.401)
Observations	201	201
Adj R^2	−0.013	0.015

Notes: *** represents significance levels of 1%. The t statistics are shown in the parentheses.
The sample in this table includes 201 events related to the initial establishment of the audit committee for 201 listed firms in Taiwan. The dependent variable here is Systematic risk (+3)-(−3), which represents the systematic risk over a period of three years after the initial establishment of the audit committee minus the systematic risk over a period of three years before it. The shares held by controlling shareholders and shares held by all insiders represent the percentages of shares held by the controlling shareholder and all insiders including directors, supervisors, and managers, respectively. The pyramidal ownership structure is a dummy variable and is assigned a value of 1 if the firm has a pyramidal ownership structure and 0 otherwise. The family-controlled firm is a dummy variable and is assigned a value of 1 if more than a third of the firm's directors are family members and 0 otherwise. Big 4 represents the Big 4 accounting firms, and is a dummy variable that is assigned a value of 1 if the firm's financial statements are audited by one of the Big 4 accounting firms and 0 otherwise. Crisis is a dummy variable that is assigned a value of 1 if the firm establishes its audit committee during the financial crisis of 2007–2008 and 0 otherwise. INDFIN is a dummy variable that is assigned a value of 1 if the firm is in the financial sector and 0 otherwise. Voluntary adoption is a dummy variable that is assigned a value of 1 if the firm establishes its audit committee voluntarily and 0 otherwise. Firm size is measured by the natural log of equity market value. Leverage represents the relative leverage that is measured by the firm's debt ratio minus the average debt ratio for the industry, and the debt ratio is defined by the total debt divided by the total assets.

value (Adam & Goyal, 2008).

Table 6 categorizes the overall sample of firms into four groups according to the median of the firms' insider shareholdings and the median of the firms' growth opportunities. Panels A and B use the shares held by the controlling shareholder as a proxy for the insider shareholdings, and Panels C and D use the shares held by all the insiders as a proxy for the insider shareholdings. The results in Panels A and B show that only firms in the category with lower growth opportunities and fewer shares held by the controlling shareholder could experience a significant decline in systematic risk following the establishment of the committee. The firms categorized within the three other groups, however, do not experience such a decrease in risk following the events. For example, the Systematic risk (+3)-(−3) of −0.128 for the firms in the category with lower growth opportunities and fewer shares held by the controlling shareholder means that the systematic risk for these firms over a period of three years after the establishment of the committee would be 0.128 lower than that over a period of three years before it.

The results in Panels C and D also show that only firms in the category with lower growth opportunities and fewer shares held by all the insiders could experience a significant decline in systematic risk following the establishment of the committee. The firms categorized within the three other groups still do not enjoy such a decrease in risk following the events. For example, the Systematic risk (+3)-(−3) of −0.106 for the firms in the category with lower growth opportunities and fewer shares held by all insiders means that the systematic risk for these firms over a period of three years after the establishment of the committee would be 0.106 lower than that over a period of three years before it.

Table 7 investigates the impacts of the pyramidal ownership structure and growth opportunities on the changes in risk following the establishment of the committee. The table categorizes the overall sample of firms into four groups according to whether or not the firm has a pyramidal ownership structure and the median of the firms' growth opportunities. The results show that only those low-

Table 6
Influence of insider shareholding and growth opportunities on changes in systematic risk.

Panel A: Firms with lower growth opportunities						
	Firms with more shares held by controlling shareholders (N = 55)		Firms with less shares held by controlling shareholders (N = 56)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	0.035	0.706	−0.088	−1.925*	0.123	1.825*
Systematic risk (+2)-(−2)	0.036	0.818	−0.053	−1.651	0.089	1.628
Systematic risk (+3)-(−3)	−0.006	−0.143	−0.128	−3.458***	0.122	2.044**
Panel B: Firms with higher growth opportunities						
	Firms with more shares held by controlling shareholders (N = 56)		Firms with lessshares held by controlling shareholders (N = 56)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	0.307	1.235	0.087	1.464	0.220	0.859
Systematic risk (+2)-(−2)	0.308	1.231	0.050	1.039	0.258	1.013
Systematic risk (+3)-(−3)	0.336	1.356	0.073	1.467	0.262	1.039
Panel C: Firms with lower growth opportunities						
	Firms with more shares held by all insiders (N = 55)		Firms with less shares held by all insiders (N = 56)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	−0.007	−0.147	−0.050	−1.159	0.043	0.635
Systematic risk (+2)-(−2)	0.006	0.142	−0.027	−0.878	0.034	0.619
Systematic risk (+3)-(−3)	−0.033	−0.675	−0.106	−3.021***	0.073	1.223
Panel D: Firms with higher growth opportunities						
	Firms with more shares held by all insiders (N = 56)		Firms with less shares held by all insiders (N = 56)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	0.312	1.254	0.083	1.373	0.229	0.893
Systematic risk (+2)-(−2)	0.296	1.183	0.062	1.262	0.234	0.918
Systematic risk (+3)-(−3)	0.329	1.325	0.080	1.674*	0.248	0.983

Note: *, **, and *** represent significance levels of 10%, 5% and 1% based on a two-tailed test, respectively.
The sample in this study includes 223 events regarding the initial establishment of the audit committee for 223 listed firms in Taiwan. Systematic risk (+1)-(−1), Systematic risk (+2)-(−2) and Systematic risk (+3)-(−3) represent the systematic risk over a period of one year, two years, and three years after the initial establishment of the audit committee minus the systematic risk over a period of one year, two years, and three years before it, respectively. Panels A (C) and B (D) show the results for the firms with lower and higher growth opportunities, respectively. Furthermore, the growth opportunities are measured by the ratio of the market value of assets to the book value of assets. The sample firms are categorized into 4 groups based on the median of growth opportunities and the insider shareholdings.

growth firms with a pyramidal ownership structure could experience a significant decline in systematic risk following the establishment of the committee. Those firms categorized within the three other groups, however, do not experience such a significant decline in risk following the events. For example, the Systematic risk (+3)-(−3) of −0.127 for these low-growth firms with a pyramidal ownership structure means that the systematic risk for these firms over a period of three years after the establishment of the committee would be 0.127 lower than that over a period of three years before it.

Table 8 investigates the influences of the family-controlled firm and growth opportunities on the changes in risk following the establishment of the committee. The table categorizes the overall sample of firms into four groups according to whether or not the

Table 7
Influence of a pyramidal ownership structure and growth opportunities on changes in systematic risk.

Panel A: Firms with lower growth opportunities

	With a pyramidal ownership structure (N = 57)		Without a pyramidal ownership structure (N = 54)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	−0.077	−1.730*	0.020	0.406	−0.097	−1.447
Systematic risk (+2)-(−2)	−0.068	-2.088**	0.050	1.137	−0.118	−2.175**
Systematic risk (+3)-(−3)	−0.127	−3.605***	−0.009	−0.193	−0.118	−1.990**

Panel B: Firms with higher growth opportunities

	With a pyramidal ownership structure (N = 32)		Without a pyramidal ownership structure (N = 80)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	0.404	0.945	0.114	2.046**	0.289	1.023
Systematic risk (+2)-(−2)	0.393	0.901	0.094	2.138**	0.299	1.058
Systematic risk (+3)-(−3)	0.429	0.996	0.114	2.600**	0.314	1.124

Note: *, **, and *** represent significance levels of 10%, 5% and 1% based on a two-tailed test, respectively.
The sample in this study includes 223 events regarding the initial establishment of the audit committee for 223 listed firms in Taiwan. Systematic risk (+1)-(−1), Systematic risk (+2)-(−2) and Systematic risk (+3)-(−3) represent the systematic risk over a period of one year, two years, and three years after the initial establishment of the audit committee minus the systematic risk over a period of one year, two years, and three years before it, respectively. Panels A (C) and B (D) show the results for the firms with lower and higher growth opportunities, respectively. Furthermore, the growth opportunities are measured by the ratio of the market value of assets to the book value of assets. The sample firms are categorized into 4 groups based on the median of growth opportunities and whether the firm has a pyramidal ownership structure.

Table 8
Influence of family-controlled firms and growth opportunities on changes in systematic risk.

Panel A: Firms with lower growth opportunities

	Family-controlled firms (N = 3)		Non-family-controlled firms (N = 108)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	0.314	0.811	−0.039	−1.172	0.353	1.700*
Systematic risk (+2)-(−2)	0.282	0.838	−0.018	−0.703	0.301	1.781*
Systematic risk (+3)−(−3)	0.272	0.811	−0.079	−2.703***	0.352	1.920*

Panel B: Firms with higher growth opportunities

	Family-controlled firms (N = 5)		Non-family-controlled firms (N = 107)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	0.117	0.434	0.201	1.509	−0.084	−0.135
Systematic risk (+2)-(−2)	−0.001	−0.003	0.187	1.407	−0.188	−0.303
Systematic risk (+3)-(−3)	0.065	0.435	0.211	1.598	−0.146	−0.237

Note: *, **, and *** represent significance levels of 10%, 5% and 1% based on a two-tailed test, respectively.
The sample in this study includes 223 events regarding the initial establishment of the audit committee for 223 listed firms in Taiwan. Systematic risk (+1)-(−1), Systematic risk (+2)-(−2) and Systematic risk (+3)-(−3) represent the systematic risk over a period of one year, two years, and three years after the initial establishment of the audit committee minus the systematic risk over a period of one year, two years, and three years before it, respectively. Panels A (C) and B (D) show the results for the firms with lower and higher growth opportunities, respectively. Furthermore, the growth opportunities are measured by the ratio of the market value of assets to the book value of assets. The sample firms are categorized into 4 groups based on the median of growth opportunities and whether the firm is a family-controlled firm.

firm is a family-controlled firm and the median of the firms' growth opportunities. The results show that only those low-growth firms not controlled by a family could experience a significant decline in systematic risk following the establishment of the committee. Those firms categorized within the three other groups, however, do not experience such a significant decrease in risk following the events. For example, the Systematic risk (+3)-(−3) of −0.079 for these low-growth firms not controlled by a family means that the systematic risk for these firms over a period of three years after the establishment of the committee would be 0.079 lower than that over a period of three years before it.

Table 9 investigates the influences of the Big 4 accounting firms and growth opportunities on the changes in risk following the establishment of the committee. The table categorizes the overall sample of firms into four groups according to whether or not the firm is audited by one of the Big 4 accounting firms and the median of the firms' growth opportunities. The results show that only

Table 9
Influence of Big 4 accounting firms and growth opportunities on changes in systematic risk.

Panel A: Firms with lower growth opportunities						
	Big 4 (N = 81)		Non-Big 4 (N = 30)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	−0.026	−0.679	−0.036	−0.543	0.009	0.127
Systematic risk (+2)-(−2)	−0.023	−0.693	0.023	0.492	−0.046	−0.745
Systematic risk (+3)-(−3)	−0.101	−2.767***	0.015	0.313	−0.116	−1.738*
Panel B: Firms with higher growth opportunities						
	Big 4 (N = 91)		Non-Big 4 (N = 21)		Difference	
	Mean	t	Mean	t	Mean	t
Systematic risk (+1)-(−1)	0.249	1.607	−0.026	−0.245	0.276	0.840
Systematic risk (+2)-(−2)	0.222	1.429	−0.007	−0.081	0.229	0.700
Systematic risk (+3)-(−3)	0.254	1.649	−0.008	−0.101	0.262	0.810

Note: *, **, and *** represent significance levels of 10%, 5% and 1% based on a two-tailed test, respectively.
The sample in this study includes 223 events regarding the initial establishment of the audit committee for 223 listed firms in Taiwan. Systematic risk (+1)-(−1), Systematic risk (+2)-(−2) and Systematic risk (+3)-(−3) represent the systematic risk over a period of one year, two years, and three years after the initial establishment of the audit committee minus the systematic risk over a period of one year, two years, and three years before it, respectively. Panels A (C) and B (D) show the results for the firms with lower and higher growth opportunities, respectively. Furthermore, the growth opportunities are measured by the ratio of the market value of assets to the book value of assets. The sample firms are categorized into 4 groups based on the median of growth opportunities and whether the firm's financial statements are audited by one of the Big 4 accounting firms.

those low-growth firms audited by one of the Big 4 accounting firms could enjoy a significant decline in systematic risk following the establishment of the committee. Those firms categorized within the three other groups, however, do not experience such a significant decrease in risk following the events. For example, the Systematic risk (+3)-(−3) of −0.101 for these low-growth firms audited by one of the Big 4 accounting firms means that the systematic risk for these firms over a period of three years after the establishment of the committee would be 0.101 lower than that over a period of three years before it.

For the robustness tests, we also measure the growth opportunities using the ratio of the equity market value to the book value (Lewellen, Loderer, & Martin, 1987), and perform the same analyses as in Tables 6–9. The results (not tabulated) are generally the same as those shown in Tables 6–9. Taken together, Tables 6–9 show that the systematic risk would not decline following the establishment of the committee for those high-growth firms, and the benefits of reducing risk only appear within certain low-growth firms. The results also show that whether or not a low-growth firm would experience a decline in risk is significantly related to its corporate governance. Specifically, the low-growth firms with lower insider shareholdings, with a pyramidal ownership structure, and not controlled by a family or audited by one of the Big 4 accounting firms would be more likely to see a decline in systematic risk following the establishment of the committee.

Why do the benefits in terms of reduced risk only exist in certain low-growth firms? I consider that the reason for this is related to the agency problem of overinvestment, which arises because managers are likely to invest in projects with a negative net present value, and that this overinvestment problem could be more likely to occur in a low-growth firm (Jensen, 1986). As the low-growth firms are more likely to overinvest, and consequently more likely to bear additional risks, the monitoring function exercised by the audit committee is, therefore, more significant for these firms and, as a result, the benefits in terms of a reduction in risk are more likely to be seen following the audit committee's establishment.

Table 5 examines the influences of corporate governance on the changes in risk following the establishment of the committee for the overall sample of firms. Since Tables 6–9 show that the benefits from reducing risk only appear in low-growth firms, I therefore categorize the sample firms into high- and low-growth firms, and perform the regression analyses for high- (Table 10) and low-growth firms (Table 11), respectively. The growth opportunities in the two tables are either measured by the ratio of the assets' market value to the book value (Models 1 and 2) or by the ratio of the equity market value to the book value (Models 3 and 4). The dependent variable in both tables is the change in systematic risk, which is measured by the systematic risk over a period of three years after the establishment of an audit committee minus that over a period of three years before it. The results in Table 10 show that the influences of corporate governance on the changes in risk are all statistically insignificant for high-growth firms. On the contrary, the results in Table 11 show that the influences of corporate governance on the changes in risk are all statistically significant for low-growth firms.

As shown in Table 11, the coefficients of both the shares held by the controlling shareholder and the shares held by all insiders are all significantly positive, suggesting that the low-growth firms with lower insider shareholdings are more likely to see a decrease in systematic risk following the establishment of an audit committee. The coefficients of the pyramidal ownership structure are all significantly negative, suggesting that those low-growth firms with a pyramidal ownership structure are more likely to experience a decrease in systematic risk following the event. While there are only 8 family-controlled firms in the sample, the coefficients of these family-controlled firms are all significantly positive, implying that those low-growth firms not controlled by a family are more likely to experience a decline in systematic risk following the establishment of the audit committee. Finally, the coefficients of the Big 4 are

Table 10
Influence of corporate governance on changes in systematic risk for high-growth firms.

Dependent variable: Changes in systematic risk				
	Growth opportunities are measured by the ratio of the assets' market value to book value		Growth opportunities are measured by the ratio of equity market value to book value	
	Model 1	Model 2	Model 3	Model 4
Constant	0.861	0.427	0.909	0.552
	(0.378)	(0.192)	(0.398)	(0.248)
Shares held by controlling shareholders	0.004		0.005	
	(0.496)		(0.514)	
Shares held by all insiders		0.014		0.015
		(1.565)		(1.617)
Pyramidal ownership structure	0.386	0.250	0.371	0.228
	(1.100)	(0.705)	(1.066)	(0.647)
Family-controlled firm	−0.083	0.089	−0.088	0.085
	(−0.104)	(0.112)	(−0.110)	(0.107)
Big 4	0.145	0.175	0.128	0.124
	(0.364)	(0.446)	(0.320)	(0.315)
Crisis	−0.119	−0.120	−0.137	−0.170
	(−0.103)	(−0.105)	(−0.117)	(−0.149)
INDFIN	−0.244	−0.139	−0.306	−0.241
	(−0.139)	(−0.085)	(−0.172)	(−0.147)
Voluntary adoption	0.062	0.014	0.050	−0.009
	(0.108)	(0.025)	(0.087)	(−0.016)
Firm size	−0.069	−0.055	−0.070	−0.059
	(−0.600)	(−0.488)	(−0.611)	(−0.524)
Leverage	−0.008	−0.011	−0.009	−0.012
	(−0.914)	(−1.252)	(−0.958)	(−1.315)
Observations	100	100	100	100
Adj R^2	−0.054	−0.028	−0.053	−0.026

The sample in this table includes 100 events regarding the initial establishment of the audit committee for 100 listed firms in Taiwan. The dependent variable here is Systematic risk (+3)-(−3), which represents the systematic risk over a period of three years after the initial establishment of the audit committee minus the systematic risk over a period of three years before it. The shares held by controlling shareholders and shares held by all insiders represent the percentages of shares held by the controlling shareholder and all insiders including directors, supervisors, and managers, respectively. The pyramidal ownership structure is a dummy variable and is assigned a value of 1 if the firm has a pyramidal ownership structure and 0 otherwise. The family-controlled firm is a dummy variable and is assigned a value of 1 if more than a third of the firm's directors are family members and 0 otherwise. Big 4 represents the Big 4 accounting firms, and is a dummy variable that is assigned a value of 1 if the firm's financial statements are audited by one of the Big 4 accounting firms and 0 otherwise. Crisis is a dummy variable that is assigned a value of 1 if the firm establishes its audit committee during the financial crisis of 2007–2008 and 0 otherwise. INDFIN is a dummy variable that is assigned a value of 1 if the firm is in the financial sector and 0 otherwise. Voluntary adoption is a dummy variable that is assigned a value of 1 if the firm establishes its audit committee voluntarily and 0 otherwise. Firm size is measured by the natural log of equity market value. Leverage represents the relative leverage that is measured by the firm's debt ratio minus the average debt ratio for the industry, and the debt ratio is defined by the total debt divided by the total assets.

all significantly negative, implying that those low-growth firms audited by one of the Big 4 accounting firms are more likely to see a decline in systematic risk following the setting up of the committee.

In addition, Table 11 also shows that two control variables, crisis and firm size, have a significant influence on systematic risk following the establishment of an audit committee. Specifically, the coefficients of crisis are all significantly positive, implying that low-growth firms that set up their audit committees during the financial crisis of 2007–2008 are more likely to see an increase in systematic risk following their establishment. In other words, a financial crisis tends to increase a firm's systematic risk. The coefficients for firm size are all significantly positive, suggesting that the low-growth and small firms are more likely to enjoy a decrease in systematic risk following the establishment of an audit committee.

Taken together, the results in Tables 10 and 11 show that the impacts of corporate governance on a change in risk are only felt in low-growth firms. As the low-growth firms with lower insider shareholdings or having a pyramidal structure are accompanied by more severe agency problems, the establishment of an audit committee would be more helpful in enhancing their monitoring function, and thereby reducing their risk. In addition, the results indicate that those low-growth firms audited by one of the Big 4 accounting firms, or not controlled by a family are more likely to see a decline in risk, suggesting that the Big 4 accounting firms complement the monitoring function of an audit committee in reducing risk, and that the audit committee would be less likely to perform such a role in a family-controlled firm.

Given the small sample investigated in this study and the presence of outliers for the variable of leverage, I employ the process of a 90% winsorization for the variable of leverage, and re-perform the regression analyses. That is, all data below the 5th percentile are set to the 5th percentile, and data above the 95th percentile are set to the 95th percentile. The results are still the same as in the previous analyses (and hence are not tabulated).

Table 11
Influence of corporate governance on changes in systematic risk for low-growth firms.

Dependent variable: Changes in systematic risk				
	Growth opportunities are measured by the ratio of the assets' market value to book value		Growth opportunities are measured by the ratio of equity market value to book value	
	Model 1	Model 2	Model 3	Model 4
Constant	−0.939	−1.111	−0.817	−0.920
	(−1.986)*	(−2.376)**	(−1.810)*	(−2.068)**
Shares held by controlling shareholders	0.005		0.004	
	(3.014)***		(2.837)***	
Shares held by all insiders		0.006		0.006
		(3.781)***		(3.461)***
Pyramidal ownership structure	−0.129	−0.112	−0.134	−0.110
	(−2.206)**	(−2.020)**	(−2.355)**	(−2.038)**
Family-controlled firm	0.371	0.348	0.374	0.355
	(2.390)**	(2.295)**	(2.429)**	(2.340)**
Big 4	−0.151	−0.144	−0.168	−0.163
	(−2.519)**	(−2.469)**	(−2.753)***	(−2.733)***
Crisis	0.522	0.479	0.527	0.491
	(3.737)***	(3.522)***	(3.817)***	(3.631)***
INDFIN	−0.099	−0.113	−0.111	−0.130
	(−1.147)	(−1.336)	(−1.324)	(−1.567)
Voluntary adoption	0.058	0.060	0.045	0.045
	(0.638)	(0.680)	(0.505)	(0.512)
Firm size	0.053	0.063	0.048	0.054
	(2.001)**	(2.406)**	(1.900)*	(2.165)**
Leverage	0.001	0.001	0.001	0.001
	(0.690)	(0.599)	(0.641)	(0.577)
Observations	101	101	101	101
Adj R^2	0.272	0.307	0.281	0.308

Notes: *, **, and *** represent significance levels of 10%, 5% and 1%, respectively. The t statistics are shown in the parentheses.
The sample in this table includes 101 events regarding the initial establishment of the audit committee for 101 listed firms in Taiwan. The dependent variable here is Systematic risk (+3)-(−3), which represents the systematic risk over a period of three years after the initial establishment of the audit committee minus the systematic risk over a period of three years before it. The shares held by controlling shareholders and shares held by all insiders represent the percentages of shares held by the controlling shareholder and all insiders including directors, supervisors, and managers, respectively. The pyramidal ownership structure is a dummy variable and is assigned a value of 1 if the firm has a pyramidal ownership structure and 0 otherwise. The family-controlled firm is a dummy variable and is assigned a value of 1 if more than a third of the firm's directors are family members and 0 otherwise. Big 4 represents the Big 4 accounting firms, and is a dummy variable that is assigned a value of 1 if the firm's financial statements are audited by one of the Big 4 accounting firms and 0 otherwise. Crisis is a dummy variable that is assigned a value of 1 if the firm establishes its audit committee during the financial crisis of 2007–2008 and 0 otherwise. INDFIN is a dummy variable that is assigned a value of 1 if the firm is in the financial sector and 0 otherwise. Voluntary adoption is a dummy variable that is assigned a value of 1 if the firm establishes its audit committee voluntarily and 0 otherwise. Firm size is measured by the natural log of equity market value. Leverage represents the relative leverage that is measured by the firm's debt ratio minus the average debt ratio for the industry, and the debt ratio is defined by the total debt divided by the total assets.

Using an event study, I examine the stock price responses to announcements to establish audit committees. The results show that establishing an audit committee has no significant influence on stock prices for the overall sample of firms. In addition, following the same rule of categorizing the sample firms into four groups based on a firm's growth opportunities and the variables for corporate governance, the results show that corporate governance still has no significant influence on the stock prices of the low-growth firms (not tabulated), which is different from the results for the systematic risk.

I consider that there are two possible reasons why such announcements regarding the establishment of an audit committee have no impact on a firm's stock price. First, since the audit committee is a completely new institution, investors may be unable to understand the possible benefits and costs that arise following the establishment of the audit committee. Second, the Taiwan stock market may not be sufficiently efficient to respond to the possible influences of establishing an audit committee within a short period of time.

6. Conclusions

Taiwan's corporate-board structure is based on a two-tier system that is comprised of a board of directors and a board of supervisors. However, the supervisors have been criticized for not performing their duties effectively. To improve corporate governance, Taiwan's authorities in 2006 revised the Securities and Exchange Act, and made it mandatory for those firms in the financial sector and large firms to establish an audit committee to replace the existing supervisors. Under the newly-revised Securities and Exchange Act, the firm's important policies are required to be monitored by the audit committee. Since the audit committee is

regulated to be more independent and professional than the board of supervisors, I consider that the agency problem could be eased and the firm's systematic risk reduced following the initial establishment of an audit committee.

The results indicate that while the systematic risk does not change significantly following the establishment of an audit committee, and most of the corporate governance variables do not influence the changes in risk for the overall sample of firms, the systematic risk does decrease significantly after the event for certain low-growth firms. I consider that the phenomenon that the benefit of reducing risk only exists in low-growth firms following the establishment of the committee could be related to overinvestment, as low-growth firms are associated with a more severe agency problem of overinvestment (Jensen, 1986), and they are more likely to enjoy a decrease in risk because of the enhanced monitoring mechanisms. I also find that the changes in risk following the event for the low-growth firms are significantly related to their corporate governance. Specifically, the low-growth firms with lower insider shareholdings, with a pyramidal ownership structure, not controlled by a family, or audited by one of the Big 4 accounting firms are more likely to see the benefits of a decrease in systematic risk following the establishment of an audit committee.

This study contributes to the literature in that it focuses on a unique setting of regulatory revision to examine the changes in systematic risk following the initial establishment of an audit committee. While the issue might not be investigated in the case of firms in a one-tier system country like the US or the UK, the issue could be studied in the context of those firms in a country where firms have switched their board structure from a two-tier system to a one-tier system such as in Taiwan.

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