



Contents lists available at ScienceDirect

Research in International Business and Finance

journal homepage: www.elsevier.com/locate/ribaf

Corporate governance, capital structure and firm performance: Evidence from Thailand

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ARTICLE INFO

Keywords:

Corporate governance
Financial leverage
Firm performance
Mediator variable

ABSTRACT

We examine the relationship between corporate governance and firm performance for a panel sample of 493 firms of non-financial firms in Thailand during the period 2001–2014. We find that for the full sample, corporate governance is not associated with financial leverage and firm performance. Leverage has a positive effect on firm performance. When we split firms into small and large firm subsamples, we observe some influence of corporate governance. The negative effect of audit committee size on firm performance is evident for large firms while the effect of audit reputation on firm performance is evident for small firms only. Furthermore, financial leverage mediates the effect of audit committee size on firm performance for the large firms.

1. Introduction

Is financial leverage a mediating variable between corporate governance and firm performance? To the best of our knowledge, this question has not been addressed in the literature. The extant literature focuses mainly on (1) the effect of corporate governance on firm performance (Chen et al., 2005; Hossain et al., 2001), (2) the effect of corporate governance on financial leverage (Connelly et al., 2012; Jiraporn et al., 2012), and (3) the effect of financial leverage on firm performance (González, 2013; Vithessonthi and Tongurai, 2015). Addressing the question of whether financial leverage mediates the effect of corporate governance on firm performance is important for the following reasons. First, corporate governance may not have a direct effect on firm performance. If the influence of corporate governance on firm performance is indirect, examining the mediating effect of financial leverage on firm performance could explain the mixed results regarding the effect of corporate governance on firm performance. Second, by looking at financial leverage as one of potential mediators, we would have a better understanding of how changes in corporate governance may affect firm performance.

Without good corporate governance, a country may experience a crisis. For instance, when many firms become too leveraged and/or have a high level of short-term debt (e.g., due to weak corporate governance practices/systems), a financial crisis may occur. The Asian Financial Crisis of 1997 and the Global Financial Crisis of 2007 are two prime examples of a financial crisis arguably originating from the firms' financing decisions. The literature on the effect of corporate governance and firm performance has been expanding in recent years. While some studies (Bhagat and Bolton, 2008; Duffhues and Kabir, 2008; Yang and Zhao, 2014) indicate that there is a direct relationship between these two variables, several studies show the indirect effect of corporate governance on firm performance. For example, McDonald et al. (2008) find that CEOs' external advice network mediates the effect of CEO stock

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Received 20 September 2016; Received in revised form 7 June 2017; Accepted 3 July 2017

Available online 13 July 2017

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ownership on firm performance for a sample of US firms. Zhang et al. (2014) find that research and development (R & D) investment mediates the relationship between ownership concentration and firm performance for a sample of Chinese IT firms.

It is important to note that firms behave differently, depending on the context in which they operate. For example, the one-tier board model is adopted in the US whereas the two-tier board model is used in countries such as Germany. Historically, the one-tier board system has been used in Thailand, but there is an ongoing discussion of a change from the one-tier board system to the two-tier board system. Laws and regulations arguably play an important role in shaping the firm's behaviors. Unlike the US where firms have to comply with different sets of laws and regulations at the state and the federal levels, firms in Thailand generally have to comply with laws and regulations at a country level. Therefore, it can be argued that at any point in time, firms in Thailand deal with a less diverse set of laws and regulations than those in the US.

We have two primary objectives in this paper. First, we examine the influence of corporate governance on financial leverage and firm performance in an emerging market country that has undertaken several reforms following a financial crisis. Second, we investigate whether financial leverage mediates the relationship between corporate governance and firm performance. To address the two objectives, we examine a sample of publicly listed firms in Thailand for three reasons. First, Thailand has implemented many reforms following the Asian Financial Crisis in 1997–1998. Thailand began its corporate governance reforms process by requiring and recommending a series of good corporate governance practices in 2000s. Second, Thailand is one of major emerging market countries in Asia. Third, the listed firms in Thailand operate in one-tier board system. In many ways, the development of corporate government systems in Thailand follows that of Hong Kong, which is one of emerging market countries in Asia. In the context of studies on corporate governance in Asia, this article is closely related to that of Chen et al. (2005), Connelly et al. (2012), and Prommin et al. (2014).

According to the trade-off theory of capital structure, firms choose the optimal composition of debt in their capital structure in order to maximize the benefits from the interest tax shield (against the costs of future financial distress, which increases with the use of debt financing). One of key reasons for the Asian Financial Crisis of 1997 is that firms became highly leveraged. To demonstrate the potential importance of this issue, we graphically plot a time-series pattern of financial leverage (LEV), measured as the ratio of total debt to total assets, and of firm performance, measured as return on equity (ROE), which is computed as the ratio of earnings before interest and taxes to total equity, for a sample of non-financial listed firms in Thailand over the period 2001–2014 in Fig. 1. As a simple matter of interpretation, Fig. 1 suggests that the average degree of financial leverage has decreased in recent years (i.e., from 32.16% in 2001 to 24.04% in 2014) and that firm performance has deteriorated over the same period (i.e., from 16.67% in 2001 to 11.79% in 2014). This pattern implies a positive relationship between financial leverage and firm performance (that is, as financial leverage decreases, firm performance also declines).

We use a panel data set of non-financial firms in Thailand to empirically test the extent to which financial leverage mediates the relationship between corporate governance and firm performance. With this data set, we apply an OLS regressions estimation technique and use alternative measures of firm performance to assess the robustness of the results. Overall, we contribute to the literature on corporate governance of firms by examining conditions under which corporate governance affects firm performance from a large panel that covers all publicly listed non-financial firms in Thailand during the period 2001–2014. This paper is closely related to prior studies that examine the effect of corporate governance on firm performance in developing economies (e.g., Connelly et al., 2012; Elsayed, 2007; Jackling and Johl, 2009) and to those addressing the similar issue in the context of advanced economies (e.g., Bhagat and Bolton, 2008; Erhardt et al., 2003; Margaritis and Psillaki, 2010).

Several key findings in this article can be briefly summarized as follows. First, the results show that financial leverage partially

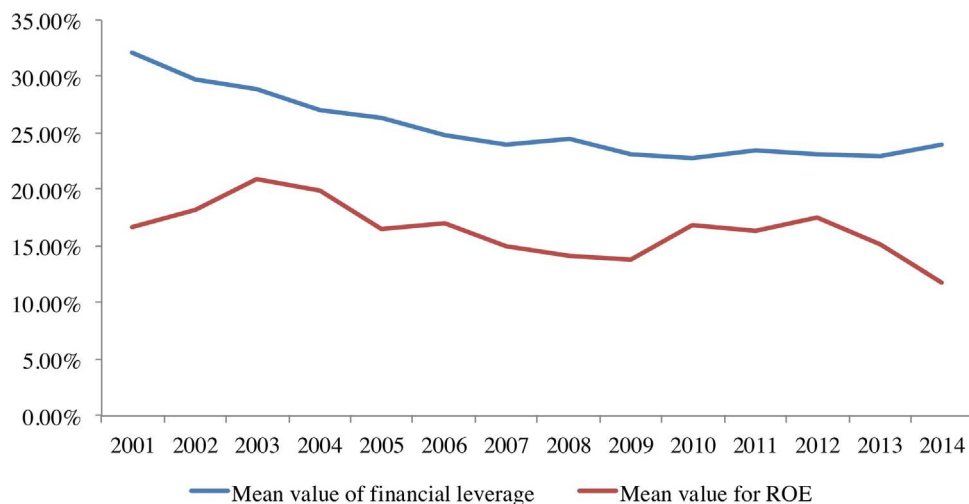


Fig. 1. Financial leverage and firm performance.

This figure presents the yearly time series of the mean values of financial leverage (measured as the ratio of total debt to total assets) and of firm performance (measured as the ratio of earnings before interest and taxes to total equity) from a sample of 3853 firm-year observations over the period 2001–2014.

mediates the effect of corporate governance and firm performance for large firms. There is no evidence to suggest that financial leverage mediates the influence of corporate governance on firm performance for small firms.

Second, for the full sample, corporate governance is not associated with financial leverage and firm performance. This finding is different to prior studies (e.g., Wen et al., 2002) that report the existence of the relationship between corporate governance and financial leverage. In addition, it is contrary to prior studies (e.g., Chen et al., 2005; Jackling and Juhl, 2009; Mak and Kusnadi, 2005) that find the relationship between corporate governance and firm performance.

Third, for large firms, the size of audit committee is negatively associated with firm performance. One plausible explanation for the negative relationship is that the audit committee performs its tasks effectively and potentially reduces upward earnings manipulation. Audit committee quality will be beneficial to the firm in the long run.

Last but not least, for small firms, audit reputation is negatively associated with firm performance. We measure audit reputation by using a binary variable that takes a value of one if a firm uses one of Big 4 auditing firms (i.e., KPMG, Deloitte, PricewaterhouseCoopers and Ernst & Young) and zero otherwise. Auditors from the large multinational auditing firms should help improve the reliability and accuracy of the firm's financial statements. The negative effect of audit reputation appears to suggest that earnings management/manipulation might be deterred by the presence of the auditors from Big 4 auditing firms.

The remainder of this article is organized as follows. Section 2 provides a literature review and hypothesis development. Section 3 discusses data and descriptive statistics. Section 4 presents the empirical results. Section 5 presents a discussion of the implication of the results. Section 6 concludes the paper and presents some directions for future research.

2. Literature review and hypothesis development

In this section, we provide a brief survey of related studies in corporate finance, corporate governance and capital structure. We then develop theoretical arguments for the relationships between corporate governance and financial leverage, corporate governance and firm performance, and financial leverage and firm performance. Subsequently, we propose testable hypotheses.

2.1. The effects of corporate governance on financial leverage

Corporate governance is a framework to build an environment of accountability, trust and transparency. Corporate governance deals with the agency problem, because of the separation of agents (e.g., managers) and shareholders. Corporate governance is an important tool to reduce conflicts between agents and that may have an influence on a firm's capital structure. Chang et al. (2014) argue that the level of debt of the firm is affected by both the firm's unique feature and conflicts of interest between its manager and shareholders.

Several researchers (e.g., Berger et al., 1997; Wen et al., 2002) have focused their attention on the relationship between corporate governance and capital structure. For example, weak governance firms are more significantly leveraged and have poorer firm performance than strong governance firms (Jiraporn et al., 2012). Strong corporate governance mechanisms are able to reduce the agency costs. Managers tend to seek lower financial leverage when they confront with good corporate governance of the board of directors (Wen et al., 2002). Corporate governance provides a guideline to resolve disputes between agents to ensure the investors or other interested parties that the agents are able to manage funds in order to maximize the value of a firm. The following subsections discuss the corporate governance attributes and their influence on a capital structure of the firm.

2.1.1. Board size and financial leverage

The boards of directors is one of the most important elements of the corporate governance mechanism in overseeing the effective and appropriate operations of the company. It plays an important role in mitigating the failure of the company (Chancharat et al., 2012). It is responsible for monitoring key activities and approving strategic decisions.

Our review of the literature reveals that why the board of directors plays an important role, there is no clear guideline on the appropriate size of the board. It has been argued that the optimal board size depends on the firm's characteristics, monitoring costs and organizational complexity (Uchida, 2011). The Stock Exchange of Thailand has provided the guidance that the board should consist of 5–12 directors, depending on size, type and complexity of the business. Prior studies provide mixed results regarding the relationship between board size and financial leverage. On the one hand, Berger et al. (1997) show that board size has a negative effect on financial leverage. On the other hand, Jensen (1986) finds that firms with larger board size have higher financial leverage than firms with smaller board size and suggests that firms with large board are more likely to use more debt financing than equity financing. The positive relationship between board size and financial leverage appears to support the notion that firms with more directors might be able to tap into their directors' networks which allow them to have better access to external financing. We therefore propose the following hypothesis.

Hypothesis 1.1. Board size is positively associated with financial leverage.

2.1.2. Board independence and financial leverage

By definition, independent directors are not major shareholders or groups of shareholders and executives of the company. They must have an appropriate qualification, as required by the board of directors, for the unique nature of the company's operations. As the independent directors may have knowledge or information, which may allow the firm to have a higher degree of financial leverage, the presence of independent directors is expected to lead to higher leverage (Berger et al., 1997). In the context of Thailand, the board of directors should have independent directors who can give their opinion about the work of management freely. In

addition, the term of the independent directors should not be longer than nine years, starting from the date of the first appointment to the position of director. In line with the literature, we expect the effect of board independence on leverage to be positive. Therefore, we propose the following hypothesis.

Hypothesis 1.2. Board independence is positively associated with financial leverage.

2.1.3. Audit committee size and financial leverage

The audit committee is one of important mechanisms in good corporate governance.¹ It is a sub-committee of the board of directors acting independently in the preparation of financial reports and accurate disclosure in compliant with reporting standards with internal control system and strong enough audit standards. The audit committee is responsible for providing advice in selecting the external auditors to the board, controlling management, creating confidence in the accuracy, reliability, and quality of financial reports (Anderson et al., 2004; Harris and Raviv, 2008). Prior studies such as that of Chen et al. (2016) show that audited financial statements provide important incremental information about the firm's credit risk to capital providers. The information may lead to a stringent credit approval, thereby affecting a chance of getting a loan.

We argue that the effectiveness of audit committee would allow firms to have better access to external financing, when needed. Hence, we expect the audit committee to be associated with financial leverage. However, the relationship could be positive or negative, depending on, for example, an initial level of leverage. On the one hand, the audit committee may enable the firm to increase its leverage due to better and reliable information perceived by the markets (e.g., the creditors and investors). On the other hand, it may lower financial the firm's leverage if the current degree of leverage is considered to be too high. This discussion points to the notion that the effect of the audit committee on leverage is conditional on other factors, such as past leverage. We propose a working hypothesis as follows.

Hypothesis 1.3. Audit committee is positively associated with financial leverage.

2.1.4. Female directorship and financial leverage

There is a growing belief that female directors would be able to improve the effectiveness of the board of directors. In this respect, Norway was the first country to explicitly set the number of female directors on the board of directors by requiring that the companies must have at least 40% of women on the board of directors. Female directors are likely to support the company's management by using their skills and knowledge on legal, human resource management, communication, and public relations more than their male counterparts (Zelevchowski and Bilimoria, 2004). Strøm et al. (2014) find that having a female CEO or female director on the board of directors will result in better financial performance, based on a sample of firms in 73 countries during the period 1998–2008.

The question is then whether female directors would try to lower the firm's leverage so as to lower financial risk, thereby pointing to the negative effect of female directorship on leverage. However, given that prior studies (see e.g., Chang et al., 2014; Huang et al., 2015) show that many firms in advanced countries have low leverage,² the presence of female directors in firms with low leverage may push them to have higher leverage. Since firms in developing countries are generally more financially constrained than those in developed countries, we expect the effect of female directorship on leverage to be positive for the former and negative for the latter. In this study, we therefore propose that:

Hypothesis 1.4. Female directorship is positively associated with financial leverage.

2.1.5. CEO duality and financial leverage

CEO duality refers to a case where a firm's CEO is also its chairman of the board of directors. The existence of CEO duality may cause a conflict of interest because it allows the CEO to control the information to be disclosed to other board members. The CEO can hinder the detection of any problems in the firm's operations, potentially making disagreement on the part of outsiders, which can intensify the potential conflicts of interest (Cornett et al., 2007).

It has been argued that different individuals should hold the positions of CEO and chairman and that the chairman must be a non-executive member of the board. Having no CEO duality allows for a clear separation between policy making and management. If the CEO is also the chairman of the board, agency costs would most likely increase since the board's ability to monitor the CEO is reduced (Dey et al., 2011). CEO duality probably has significantly increased the power of the CEO over that of the board, thereby probably reducing the effectiveness of the control mechanisms of the corporate governance structure (Simpson and Gleason, 1999) and leading to under- or over-leverage, depending on the risk preference of the CEO. Suppose that there are two groups of firms: (1) firms with CEO duality and (2) firms without CEO duality. The CEOs for both groups of firms have a relatively high level of appetite for risk, financial leverage tends to be higher for the firms with CEO duality than for the firms without CEO duality. On the other hand, when the CEOs are more risk averse, financial leverage tends to be lower for the firms with CEO duality than for the firms without CEO duality. In summary, we hypothesize that:

Hypothesis 1.5. CEO duality is negatively associated with financial leverage.

¹ In the context of Thailand, the Securities and Exchange Commission and the Stock Exchange of Thailand require that a firm must have an audit committee, consisting of at least three members, all of them must be independent directors.

² For example, Huang et al. (2015) report that the mean leverage for a sample of firms in the US during the period 2008–2012 is 0.21.

2.1.6. Ownership concentration and financial leverage

Agency theory suggests that concentrated ownership of the firm will result in more effective monitoring. Ownership concentration mitigates a conflict of interest between managers and owners (Suto, 2003). The ownership structure of a firm can also affect its capital structure as it has implications for agency relationships within the firm (Claessens and Fan, 2002; Wiwattanakantang, 1999). However, firms with high ownership concentration have another type of agency problems. That is, there might be a conflict of interest between majority shareholders and minority shareholders.

It has been suggested that single-family owned firms have a significantly higher debt level. For example, Wiwattanakantang (1999) shows that ownership concentration has a positive effect on financial leverage. In a recent study, Paligorova and Xu (2012) find that firms with more ownership concentration have higher leverage than those with less ownership concentration. The finding suggests that ownership concentration appears to be able to force managers to increase financial leverage in order to reduce managerial opportunism. Consistent with the literature, we hypothesize that:

Hypothesis 1.6. Ownership concentration is positively associated with financial leverage.

2.1.7. Audit reputation and financial leverage

If financial statements provide market participants (e.g., shareholders, potential shareholders) with information, there would be a question of the quality and accuracy of information provided by financial statements. In this respect, the reputation of an auditor can play a significant role in reducing investors' information risk, and thus reducing a firm's cost of capital (Azizkhani et al., 2010). Some studies (e.g., Caramanis and Lennox, 2008) show that audit effort is inversely related to positive abnormal accruals, suggesting that when audit effort is low, the manager tends to manage earnings upwards. We therefore argue and test whether firms that employ big international auditing firms (e.g., the so-called Big Four Auditors) have higher financial leverage than other firms. More specifically, we look at whether the reputation of the audit firm plays a role in the firm's capital structure. If a company has or is perceived to have high quality financial statements audited by auditors with good reputation, it would build its credibility and increase its opportunities to access to external sources of financing, which would in turn allow for higher financial leverage. In sum, we propose that:

Hypothesis 1.7. Audit reputation is positively associated with financial leverage.

2.2. The effects of corporate governance on firm performance

Corporate governance is the system of supervision and management that affects the determination and achievement of the objectives of the firm. It is a way to assess and control risk of the firm and to ensure that its implementation is effective. Good corporate governance structures encourage firms to create value through operations, research and development of innovation. They are also to provide accountability and adequate control systems. The 1997 Asian Financial Crisis caused many crisis-hit countries, including Thailand, to focus on creating and developing better corporate governance systems. It is essential for companies to create a culture of consciousness, transparency, and accountability, which will result in long term value creation and financial wealth for the company and its shareholders.

Since the 1997 Asian Financial Crisis, firms in Thailand as well as in other crisis-hit countries need to reduce their weakness/susceptibility to economic shocks and improve corporate governance practices. Prior studies (Connelly et al., 2012; Mak and Kusnadi, 2005) on the issue of whether corporate governance affects firm performance provide mixed results. In this subsection, we develop our hypotheses regarding the relationship between corporate governance and firm performance.

2.2.1. Board size and firm performance

The size of the board of directors plays an important role in the directors' ability to oversee and control managers (Anderson et al., 2004). A large board of director is more likely to provide better access to various resources than a small board. A board of directors with diverse experience and knowledge would probably have more careful learning and decision-making processes, thereby resulting in better firm performance. The empirical findings on the relationship between board size and firm performance are however mixed. For example, Yermack (1996) finds a negative relationship between board size and firm performance in a sample of 452 large U.S. industrial corporations over the period 1984 and 1991. Coles et al. (2008) find that firm performance increases with board size for complex firms. However, Jackling and Johl (2009) find that board size has a positive impact on performance for firms in India. Eisenberg et al. (1998) report a negative relationship between board size and firm performance in a sample of firms in Finland. Likewise, Mak and Kusnadi (2005) find a negative relationship between board size and firm value, measured as Tobin's Q, for a sample of firms in Malaysia and Singapore. Overall, these findings suggest that as board size increases, firm performance tends to deteriorate. One plausible explanation is that large boards result in less communication between board members, poorer decisions, and ineffective coordination. In addition, firms with large boards are more likely to be controlled by the CEO. If the firm can overcome these challenges associated with the larger board, firm performance should improve. In summary, we expect the effect of board size on firm performance to be positive; therefore, we hypothesize that:

Hypothesis 2.1. Board size is positively associated with firm performance.

2.2.2. Board independence and firm performance

An independent director (also known as an outside director) plays an important role in monitoring the firm's management team. Therefore, the extent to which the board of directors is independent may attract investors (Muniandy and Hillier, 2015). Prior studies

that examine board independence and firm performance provide mixed results. On the one hand, [Agrawal and Knoeber \(1996\)](#) find that board independence has a negative effect on firm value, measured as Tobin's Q, in the US. On the other hand, [Jackling and Johl \(2009\)](#) find that board independence has a positive impact on firm performance for firms in India. Likewise, [Muniandy and Hillier \(2015\)](#) report that board independence has a positive influence on firm performance in South Africa. In the context of Malaysia, [Haniffa and Hudaib \(2006\)](#) find that board independence does not affect firm performance. Consistent with the literature, we argue that the presence of capable independent directors in the board would improve firm performance. Therefore, we hypothesize that:

Hypothesis 2.2. Board independence is positively associated with firm performance.

2.2.3. Audit committee size and firm performance

An audit committee provides additional safeguards against fraud and ensures that they meet required standards and best practices. An audit committee member should have the qualifications and perform the duties. The enhanced audit committee reduces an information asymmetry problem and improves monitoring of management ([Aldamen et al., 2012](#)). The audit committee primarily oversees the firm's financial reporting processes. It meets regularly with the firm's internal financial managers and outside auditors to review the firm's financial statements, internal accounting controls and audit process ([Klein, 2002](#)). The role of audit committee is to ensure the quality of corporate financial reporting. However, the presence of an audit committee does not significantly affect the likelihood of financial statement fraud ([Beasley, 1996](#)).

We argue that firms with competent audit committee are more likely to have a lower probability of experiencing major accounting scandals, thereby lowering the chance of having unexpected poor firm performance. Therefore, we expect the relationship between audit committee size and firm performance to be positive. However, [Aldamen et al. \(2012\)](#) find a negative effect of audit committee on firm performance; more specifically, firms with smaller audit committee with more financial expertise and experience tend to have positive firm performance during the global financial crisis. In summary, we propose the following hypothesis.

Hypothesis 2.3. Audit committee size is positively associated with firm performance.

2.2.4. Female directorship and firm performance

Diversity leads to innovation and creativity. Historically, most all boards of directors mainly comprised of male directors. In recent years, there is a strong argument for having more female directors to provide different points of views that may enhance firm performance. The effect of women directorship has been empirically investigated in many studies. [Erhardt et al. \(2003\)](#) examine the relationship between demographic diversity on boards of directors (the percentage of women on boards of directors) with firm performance and find that board diversity is positively associated with firm performance. [Carter et al. \(2003\)](#) find that board diversity is associated with improved financial value for a sample of firms in the US. [García-Meca et al. \(2015\)](#) show that board gender diversity improves firm performance in a sample of bank in nine countries (Canada, France, Germany, Italy, the Netherlands, Spain, Sweden, the UK, and the US). Moreover, [Hutchinson et al. \(2015\)](#) find that board gender diversity is positively associated with firm performance. On the other hand, [Rose \(2007\)](#) does not find a significant association between female directors and firm performance of listed firms in Denmark. Consistent with the literature, we propose that:

Hypothesis 2.4. Female directorship is positively associated with firm performance.

2.2.5. CEO duality and firm performance

Consistent with Section 2.1.5, we argue that CEO duality affects firm performance. More specifically, we expect firms with CEO duality to perform poorer than firms with non-CEO duality. While CEO duality may improve the speed of decision that might be important during periods of fast changing market environments. Fast decisions could however be suboptimal or even inappropriate under some circumstances. CEOs who are also chairmen of the board of directors can exercise more control over their firms tend to decrease firm value. In addition, CEO duality has been pointed out as one of key reasons for firm failures such as that of Enron and WorldCom.

Prior studies that examine the influence of CEO duality on firm performance have shown contradicting results. [Boyd \(1995\)](#) find that the impact of CEO duality and firm performance depends on environments. [Haniffa and Hudaib \(2006\)](#) find a negative impact of CEO duality on firm performance in Malaysia. [Chen et al. \(2005\)](#) find the relationship between CEO duality and performance to be negative for firms in Hong Kong during the period 1995–1998. In addition, [Bhagat and Bolton \(2008\)](#) show that CEO duality is negatively associated with firm performance for firms in the US. In summary, we propose the following hypothesis.

Hypothesis 2.5. CEO duality is negatively associated with firm performance.

2.2.6. Ownership concentration and firm performance

The separation of ownership and control provides opportunities for managers to take decisions that are benefit for them which may harm firm performance. The closer alignment of interest influenced by managerial share ownership may improve firm performance. The controlling shareholders face strong incentives to monitor managers and maximize firm value. Ownership concentration control can reduce the agency problem between owners and managers ([Maury, 2006](#)). Concentrated ownership can increase managerial monitoring and so improve firm performance ([Agrawal and Knoeber, 1996](#)). [Bhaumik and Selarka \(2012\)](#) examine post M & A performance to show that ownership concentration reduces the owner-manager agency conflict but it may induce principal-principal conflicts.

Prior studies (e.g., [Nguyen, 2011](#)) show that ownership concentration increases idiosyncratic risk as well as firm performance. [Wiwattanakantang \(2001\)](#) finds that the ownership concentration is positively associated with firm performance in a sample of Thai firms. In addition, [Prowse \(1992\)](#) finds no relation between ownership concentration and firm performance among Japanese firms. [Mak and Kusnadi \(2005\)](#) report a similar result for firms in Malaysia and Singapore. In sum, we propose the following hypothesis.

Hypothesis 2.6. Ownership concentration is positively associated with firm performance.

2.2.7. Audit reputation and firm performance

There are several reasons for choosing Big 4 auditors. Having financial statements audited by well-known auditors would most likely reduce information asymmetry and signals financial markets about the firm's prospects. In a recent study, [DeFond and Lennox \(2011\)](#) show that following the introduction of the Sarbanes-Oxley Act of 2002, many small auditors, defined as auditors with fewer than 100 s clients, exit the market. We argue that one of key reasons for choosing large auditor is that firms are international and thus require international auditors (e.g., Big 4 auditors) to audit their foreign subsidiaries. Choosing Big 4 auditors therefore could mean that firms are large and have foreign operations. Since large firms tend to perform better than smaller firms and multinational firms are most likely to have superior performance to domestic firms, it is possible that firms with Big 4 auditors have better performance than firms without Big 4 auditors. In addition, better audit quality is expected to improve the firm's decision-making process and the resulting decisions (e.g., investment and operating decisions). Therefore, we expect the relationship between audit reputation and firm performance to be positive. In summary, we propose the following hypothesis.

Hypothesis 2.7. Audit reputation is positively associated with firm performance.

2.3. The effects of financial leverage on firm performance

[Modigliani and Miller \(1958\)](#) argue that capital structure is irrelevant in determining the value of the firm and its performance. However, some scholars ([Agrawal and Knoeber, 1996](#)) suggest that the use of debt financing can improve performance by inducing better monitoring by creditors. Empirical corporate finance literature has long provided mixed results regarding the effect of financial leverage on firm performance. That is, the effect of financial leverage on firm performance has been found to be negative, positive and insignificant. [Antoniou et al. \(2008\)](#) find that the relation between financial leverage and performance is negative. [Cai and Zhang \(2011\)](#) indicate that change in a firm's financial leverage negatively affect stock price. [Vithessonthi and Tongurai \(2015\)](#) find that financial leverage is negatively associated with firm performance for a sample of firms in Thailand. This evidence is consistent with the view that the costs of financial distress are greater than the benefits of financing. On the other hand, [Margaritis and Psillaki \(2010\)](#) find that financial leverage has a positive effect on firm performance. Furthermore, [Berger and Udell \(2006\)](#) indicate that higher financial leverage or a lower equity capital ratio is associated with better firm performance. In addition, [Connelly et al. \(2012\)](#) find no relationship between financial leverage and firm performance. If the use of debt financing causes the firm's creditors to monitor its behaviors more closely and systematically, firms with higher leverage would be more likely to invest in better projects (e.g., through stricter investment screening processes) and perform better than firms with lower leverage. Therefore, we propose the following hypothesis.

Hypothesis 3. Financial leverage is positively associated with firm performance.

2.4. The mediating effects of financial leverage on the relationship between corporate governance and firm performance

In this section, we argue that corporate governance does not exert its effect on firm performance directly but rather affects firm performance indirectly through financial leverage. As discussed in Section 2.1, corporate governance is expected to affect financial leverage and, as discussed in Section 2.3, financial leverage has been found to be associated with firm performance, we theoretically question whether mixed results regarding the relationship between corporate governance and firm performance might be due to the fact that the effect of corporate governance on firm performance is mediated by financial leverage. We propose two plausible reasons as to why financial leverage might mediate the influence of firm performance.

First, weak corporate governance may result in over- or under-leverage of the firm. Firms with very high financial leverage are more likely to experience large variation in firm performance. Likewise, firms with low leverage tend to have small variation in performance. This suboptimal level of leverage will then affect firm performance.

Second, as the board of directors evaluates and approves the firm's major investments, the effect of corporate governance on firm performance most likely depends on the ability of the board of directors to select value-creating investments and financing decisions. Suppose that two firms invest in equally good projects that should result in similar performances. One key difference that the boards of directors can have on the performance is how the projects are selected and financed. Weak corporate governance that is associated with under-/over-leverage is likely to contribute to the selection of investments and subsequent performance. If the CEO prefers low financial leverage and has a strong influence on the board, the firm may invest in low risk projects, which are possibly financed by equity financing (e.g., retained earnings), that may generate low returns.

Consistent with the above arguments, we propose the following hypotheses.

Hypothesis 4.1. Financial leverage mediates the effect of board size on firm performance.

Hypothesis 4.2. Financial leverage mediates the effect of board independence on firm performance.

Hypothesis 4.3. Financial leverage mediates the effect of audit committee size on firm performance.

Hypothesis 4.4. Financial leverage mediates the effect of female directorship on firm performance.

Hypothesis 4.5. Financial leverage mediates the effect of CEO duality on firm performance.

Hypothesis 4.6. Financial leverage mediates the effect of ownership concentration on firm performance.

Hypothesis 4.7. Financial leverage mediates the effect of audit reputation on firm performance.

3. Data and research methodology

3.1. Research methodology

In this section, we discuss some main methods of data analysis that can potentially be applied to addressing our research questions and testing our hypotheses. Recall that our main research question is whether financial leverage mediates the influence of corporate governance on firm performance. Our unit analysis is then the firm, and we seek to understand the effect of variation in financial leverage on the effect of corporate governance on firm performance.

Since the firm's decisions are indeed made by individuals associated with the firm (e.g., its owners, managers, and employees), to understand and analyze the firm would thus lead us to take into account the behavioral aspects of the firm. Therefore, we look at how the social theory can provide us some guidance. According to the social theory, there are four key paradigms: functionalist, interpretative, radical humanist and radical structuralist. Generally speaking, the functionalist paradigm, which seeks to provide rational explanations of social affairs and behaviors, has become dominant in academic sociology and mainstream academic finance. The functionalist paradigm emphasizes the importance of understanding order, equilibrium and stability in society and the way in which these can be maintained. It is concerned with the regulation and control of social affairs. Financial systems and markets are viewed as a place of concrete reality, characterized by uniformities and regularities which can be understood and explained in terms of cause and effects (Ardalan, 2008).

While there are two main research methodologies: (1) the quantitative methodology and (2) the qualitative methodology, in this paper, we choose to use the quantitative employ because the quantitative approach is better suited to empirically address our research question than the qualitative approach. More specifically, the qualitative approach, using data collection methods such as interviews and direct observation, is better at addressing the “why” and “how” research questions.

We test the hypotheses discussed in Section 2 and our research question that financial leverage is a mediating variable between corporate governance and firm performance by estimating our regressions using OLS. To verify the direction of causality and to address the endogeneity concern, we using one-lagged values for all variables in the right-hand side of all model specifications. It is reasonable to expected that, the other approaches (e.g., the qualitative method) have some limitation on testing our hypotheses and research question.

To evaluate the impact of corporate governance on capital structure, we estimate a series of panel OLS regressions of capital structure on corporate governance and a set of control variables. As appropriate, we include firm fixed-effects to control for omitted time-invariant firm characteristics, time fixed-effects to control for any unobserved time-variant effect that affects all firm in the sample, or both. We make an effort to deal with the potential endogeneity problem by lagging all right-hand side variables by one period, which should address reverse-causality concerns. In summary, we regress contemporary capital structure on lagged corporate governance and lagged control variables.

To test Hypotheses 1.1–1.7, which predict the effect of the corporate governance on the capital structure, we estimate a series of Eq. (1) using panel OLS regressions as follows:

$$LEV_{i,t} = \alpha + \beta CG_{i,t-1} + \gamma Z_{i,t-1} + \eta_i + \nu_t + \varepsilon_{i,t} \quad (1)$$

where $LEV_{i,t}$ is the ratio of total debt to total assets for firm i at time t . We use LEV to measure the firm's financial leverage. CG is a vector of a firm's corporate governance variables (i.e. board size, board independence, audit committee size, female directorship, CEO duality, ownership concentration and audit reputation). Z is a vector of firm-level control variables; η_i is the firm-fixed effect, which is included in the model specification to control for unobservable firm-specific and time-invariant heterogeneity; ν_t is the time-fixed effect, which is included in the model specification to control for unobserved time-variant effects to all firms in the sample.

To evaluate the impact of corporate governance on firm performance, we estimate a series of panel OLS regressions of firm performance on corporate governance and a set of control variables. As appropriate, we include firm fixed-effects to control for omitted time-invariant firm characteristics, time fixed-effects to control for any unobserved time-variant effect that affects all firm in the sample, or both. We lag all right-hand side variables by one period, which should address reverse-causality concerns. That is, we regress contemporary firm performance on lagged corporate governance and lagged control variables.

To test Hypotheses 2.1–2.7 that forecast the effect of the corporate governance on the firm performance, we estimate a series of Eq. (2) using panel OLS regressions as follows:

$$ROE_{i,t} = \alpha + \beta CG_{i,t-1} + \gamma Z_{i,t-1} + \eta_i + \nu_t + \varepsilon_{i,t} \quad (2)$$

where $ROE_{i,t}$ is the ratio of earnings before interest and taxes to equity for firm i at time t . We use ROE to measure the firm performance. As before, \mathbf{CG} is a vector of a firm's corporate governance variables. \mathbf{Z} is a vector of firm-level control variables; η_i is the firm-fixed effect; ν_t is the time-fixed effect.

To evaluate the impact of financial leverage on firm performance, we estimate a series of panel OLS regressions of firm performance on financial leverage and a set of control variables. As appropriate, we include firm fixed-effects and/or time fixed-effects. We regress contemporary firm performance on lagged financial leverage and lagged control variables.

To test Hypothesis 3, which predict the effect of the financial leverage on the firm performance, we estimate Eq. (3) using panel OLS regressions as follows:

$$ROE_{i,t} = \alpha + \beta LEV_{i,t-1} + \gamma \mathbf{Z}_{i,t-1} + \eta_i + \nu_t + \varepsilon_{i,t} \quad (3)$$

where $ROE_{i,t}$ is the ratio of earnings before interest and taxes to equity for firm i at time t . All other variables are defined as before.

To evaluate the impact of corporate governance and financial leverage on firm performance, we estimate a series of panel OLS regressions of firm performance on corporate governance and financial leverage and a set of control variables. We regress contemporary firm performance on lagged corporate governance, lagged financial leverage and lagged control variables.

To test Hypotheses 4.1–4.7, which predict the effect of the corporate governance and financial leverage on the firm performance, we estimate a series of Eq. (4) using panel OLS regressions as follows:

$$ROE_{i,t} = \alpha + \beta \mathbf{CG}_{i,t-1} + \delta LEV_{i,t-1} + \gamma \mathbf{Z}_{i,t-1} + \eta_i + \nu_t + \varepsilon_{i,t} \quad (4)$$

where the dependent variable is $ROE_{i,t}$. Other variables are defined as before. We use Hausman tests to decide whether fixed- or random-effects are appropriate. The results of the Hausman tests suggest that the fixed-effect models are preferred to the random-effects model.

3.2. Sample

To test our hypotheses, we construct a sample that initially contains all non-financial firms listed in Thailand over a 14-year period from 2001 to 2014. After excluding observations with missing key data, we have an unbalanced panel sample of 3,854 firm-year observations of all non-financial firms. We obtain all financial data, firm-level corporate governance and firm-level control variables from Thomson Reuter Datastream and SETSMART. We manually collect ownership data. To minimize outliers and possible data recording errors, we winsorize all variables at the 5th and 95th percentiles.

3.3. Dependent variables

To test Hypothesis 1, we measure a firm's financial leverage as the ratio of total debt to total assets. Several scholars (Margaritis and Psillaki, 2010; Vithessonthi and Tongurai, 2015) have used this variable as a measure of financial leverage. To test Hypotheses 2–4, we follow prior studies such as that of Chen et al. (2005) and Bhabra (2007) by measuring firms performance as return on equity (ROE), computed as the ratio of earnings before interest and taxes to equity. As a robustness check, we also use return on assets (ROA), measured as the ratio of earnings before interest and taxes to total assets, as an alternative measure of firm performance. Please see a list of variables description in Table 1.

3.4. Independent variables

To test the effect of corporate governance on financial leverage and firm performance, we use seven measures of corporate governance, which are in line with prior studies (see e.g., Chen et al., 2005; Nguyen, 2011). Consistent with Bhagat and Bolton (2008), board size (BD_SIZE) is measured as the number of all board directors; board independence (BD_IND) is measured as the ratio of the number of independent directors to the number of all directors; CEO duality (CEO_DUAL) is a dummy variable, which takes a value of one if the CEO is also the chairperson of the board, and zero otherwise. Ownership concentration (OWN_TOP3) is the proportion of common stock held by the top three shareholders. Audit reputation (BIG4) is a binary variable that indicates whether a firm uses one of top four auditing firms and takes a value of one where a firm's auditor is one of the big four auditing firms, and zero otherwise. The big four auditing firms include KPMG, Deloitte, PricewaterhouseCoopers and Ernst & Young. Audit committee size (BD_AUDIT) is the number of audit committee members on the board. Female directorship (BD_WOMEN) is measured as the ratio of the number of female directors to the number of all directors.

3.5. Control variables

Given that our approach to testing our hypothesis relies upon a set of underlying assumptions, we try to mitigate our concern that changes occurring within as well as outside the firm may affect our results by (1) we include a large set of firm-level control variables to control for firm-specific characteristics that might influence the firm's financial leverage and firm performance and (2) we include industry return (RETIND), which is measured as the difference of logarithm of the industry price index associated with the firm, to control for the industry-level conditions.

To control for firm-specific characteristics that might influence the firm's financial leverage and firm performance as well as to

Table 1
The variables used in the study.

Variable code	Variable name	Variable description
Corporate governance:		
BD_SIZE	Board size	A number of board directors, including a chairperson and independent directors.
BD_IND	Board independence	The ratio of the number of independent directors to the number of all directors.
BD_AUDIT	Audit committee size	A number of audit committee on the board.
BD_WOMEN	Female directorship	The ratio of number of female directors to the total number of directors.
CEO_DUAL	CEO duality	CEO duality is a dummy variable which take a value of one if the CEO is also the chairperson of the board of directors, and zero otherwise.
OWN_TOP3	Ownership concentration	The proportion of common stock held by the top three shareholders.
BIG4	Audit reputation	A binary variable, which takes a value of one where a firm's auditor is one of the big four auditing firms, and zero otherwise. The big four auditing firms include KPMG, Deloitte, PricewaterhouseCoopers and EY.
Capital structure:		
LEV	Financial leverage	The ratio of total debt to total assets.
Firm performance:		
ROE	Return on equity	The ratio of earnings before interest and taxes to equity.
ROA	Return on assets	The ratio of earnings before interest and taxes to total assets.
Control variables:		
RETIND	Industry return	The first difference of the natural logarithm of the price index.
LNTA	Firm size	The natural logarithm of total assets.
LNFAGE	Firm age	The natural logarithm of the number of years since the firm was listed.
CAPEXTA	Capital investment	The ratio of capital expenditure to one-period lagged total assets.
CACL	The current ratio	The ratio of current assets to current liabilities.
MBV	The market-to-book ratio	The ratio of the market value of common equity to the book value of common equity.
NCFOTA	The cash flow to total assets ratio	The ratio of net cash flow from operating to total assets.
PPETA	The fixed assets ratio	The ratio of net property, plant, and equipment to total assets.
ROA	Return on assets	The ratio of earnings before interest and taxes to total assets.

address concerns arising from omitted variables that might influence both financial leverage and firm performance, we also include industry return (RETIND), which is an industry-level control variable, and a large set of firm-level control variables. More specifically, we include firm size (LNTA), firm age (LNFAGE), capital investment (CAPEXTA), current ratio (CACL), the market-to-book ratio (MBV), the cash ratio (NCFOTA), the tangibility ratio (PPETA), and profitability (ROA) as the firm-level control variables.

Consistent with prior studies (Chen et al., 2005; García-Meca et al., 2015), firm size (LNTA) is measured as the natural logarithm of total assets (in million Thai Baht). Firm age (LNFAGE) is computed by the natural logarithm of the number of years since the firm was listed. Firm age can be used as an indicator of the firm's experience in its businesses. Older firms tend to have a well organizational structure, processes, and systems. On the other hand, new or younger firms are more likely to be less rigid in its organizational structure.

To control for the influence of corporate investment on leverage and firm performance, we use capital investment (CAPEXTA), which is the ratio of capital expenditure to one-period lagged total assets. We use the market-to-book ratio (MBV), computed as the ratio of the market value of common equity to the book value of common equity, to capture the firm's investment opportunities.

The current ratio (CACL) is calculated as the ratio of current assets to current liabilities. The current ratio measures the extent to which a firm has enough liquid assets to pay its short-term debt obligations. Firms with sufficient cash are better prepared to absorb liquidity shocks. Therefore, we control for cash holdings by using the cash ratio (NCFOTA), which is measured as the ratio of net operating cash flows to total assets. Keefe and Yaghoubi (2016) find that fluctuations in cash flows have a negative impact on financial leverage.

Similar to Margaritis and Psillaki (2010), the tangibility ratio (PPETA) is measured as the ratio of fixed assets to total assets. We use profitability (ROA), measured as the ratio of earnings before interest and taxes (EBIT) to total assets, to control for the influence of profitability on leverage.

3.6. Descriptive statistics

Table 2 presents the descriptive statistics of the variables used in this article for the final sample of 3,854 firm-year observations over the period 2001–2014. The mean (median) value of BD_SIZE is 10.45 (10.00), whereas the mean (median) value of BD_AUDIT is 3.06 (3.00). The mean (median) value of ROE is 0.15 (0.15), whereas the mean (median) value of ROA is 0.08 (0.08). The mean (median) value of leverage is 0.25 (0.23), suggesting that the average firm in Thailand is not overleveraged.³

Table 3 presents correlation coefficients of key variables for the final sample of 3,854 observations. As the correlation coefficients between explanatory variables are generally below 0.50, the issue of multicollinearity is not of great concern. As expected, ROE and ROA are highly correlated ($r = 0.79$), thereby indicating that they can be used almost interchangeably as a proxy for firm performance.

³ Mak and Kusnadi (2005) show that the mean value of financial leverage of a sample of firms in Singapore (Malaysia) in 2000 is 0.45 (0.45).

Table 2
Descriptive statistics on keys variables.

	Mean	Median	S.D.	Minimum	Maximum
RETIND	0.10	0.10	0.35	−0.68	0.69
LNTA	8.09	7.84	1.39	5.89	11.08
LNFAGE	2.38	2.56	0.75	0.00	3.26
CAPEXTA	5.84	3.68	6.05	0.00	22.47
CACL	2.16	1.51	1.77	0.00	7.28
MBV	1.61	1.21	1.21	0.27	4.80
NCFOTA	0.07	0.08	0.10	−0.14	0.26
PPETA	0.38	0.37	0.22	0.02	0.80
LEV	0.25	0.23	0.20	0.00	0.65
BD_SIZE	10.42	10.00	2.33	7.00	15.00
BD_IND	0.36	0.33	0.09	0.18	0.56
BD_AUDIT	3.06	3.00	0.40	0.00	5.00
BD_WOMEN	0.17	0.13	0.14	0.00	0.45
CEO_DUAL	0.17	0.00	0.38	0.00	1.00
OWN_TOP3	56.73	57.43	18.52	24.87	89.06
BIG4	0.51	1.00	0.50	0.00	1.00
ROE	0.16	0.15	0.16	−0.19	0.50
ROA	0.08	0.08	0.08	−0.09	0.23

This table reports summary statistics for key variables for the sample of 3,854 firm-year observations over the period 2001–2014. Please see Table 1 for the variable description.

When looking at correlation coefficients between financial leverage and corporate governance variables, we find that the signs are generally consistent with our hypotheses but the magnitude is small ($r < 0.08$). In addition, when looking at correlation coefficients between firm performance and corporate governance variables, we also find that the signs are generally consistent with our hypotheses but the magnitude is also small ($r < 0.08$). For example, the relationship between board size (BD_SIZE) and ROA is positive while the relationship between CEO duality (CEO_DUAL) and ROA is negative.

4. Empirical results

4.1. The effects of corporate governance on financial leverage

In this section, we present our empirical results regarding the effects of corporate governance characteristics on financial leverage. Table 4 presents panel OLS regression where the dependent variable is financial leverage (LEV). Firm-fixed effects and year-fixed effects are included in all models. In model (1), which is the baseline regression where we include only industry- and firm-level control variables. The results suggest that firm size (LNTA), firm age (LNFAGE), capital investment (CAPEXTA) and market-to-book ratio (MBV) are positively related to financial leverage. The current ratio (CACL), the cash flow to total assets ratio (NCFOTA) and profitability (ROA) are negatively associated with financial leverage. Interestingly, the industry return (RETIND) and the tangibility ratio (PPETA) are not associated with financial leverage.

To test the direct effect of corporate governance on financial leverage, we add the main variables of concern (i.e., board size (BD_SIZE), board independence (BD_IND), audit committee size (BD_AUDIT), female directorship (BD_WOMEN), CEO duality (CEO_DUAL), ownership concentration (OWN_TOP3) and audit reputation (BIG4)) in Model (2). The coefficients on firm size (LNTA), firm age (LNFAGE), capital investment (CAPEXTA) and the market-to-book ratio (MBV) remain positive and statistically significant, while the coefficients on the current ratio (CACL), the cash flow to total assets ratio (NCFOTA) and profitability (ROA) are negative and statistically significant. The results show that all corporate governance variables are not associated with financial leverage since the coefficients on corporate governance variables are not statistically significant. These findings do not provide support for Hypotheses 1.1 to 1.7 that predict the relationship between corporate governance and the degree of financial leverage. However, these findings are consistent with some studies that examine firms in developing countries. For example, Wen et al. (2002) find no relationship between board size and financial leverage for listed firms in China.

4.2. The effects of corporate governance and financial leverage on firm performance

In this section, we examine the influence of corporate governance characteristics and financial leverage on firm performance. Table 5 presents the estimation results of the panel OLS regressions where the dependent variable is return on equity (ROE). Firm-fixed effects and year-fixed effects are included in all models. In Model (1), which is the baseline panel OLS regression which includes only control variables. The results suggest that the industry return (RETIND), the market-to-book ratio (MBV) and the cash flow to total assets ratio (NCFOTA) are positively related to firm performance, while firm size (LNTA) and the current ratio (CACL) are negatively associated with firm performance. It is important to note the negative effect of firm size on firm performance is inconsistent with prior studies (e.g., Elsayed, 2007).

To test the direct effect of corporate governance on firm performance, we add board size (BD_SIZE), board independence

Table 3
Pearson Correlation Coefficients.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1. BD_SIZE	1.00																		
2. BD_IND	-0.45- ***	1.00																	
3. BD_AU-DIT	0.19***	0.09***	1.00																
4. BD_WO-MEN	-0.17- ***	0.02	0.00	1.00															
5. CEO_D-UAL	-0.14- ***	0.04**	0.01	0.08***	1.00														
6. OWN_T-OP3	-0.07- ***	-0.02	-0.02	0.03*	0.03*	1.00													
7. BIG4	0.19***	-0.04- ***	0.00	-0.14- ***	-0.08- ***	0.13***	1.00												
8. LNTA	0.35***	-0.03- **	0.08***	-0.22- ***	-0.06- ***	0.05***	0.4***	1.00											
9. LNFAGE	0.23***	-0.04- ***	0.05***	0.00	-0.05- ***	-0.12- ***	0.13***	0.19***	1.00										
10. RETIND	0.00	0.02	0.00	0.00	-0.01	-0.02	-0.01	0.00	0.05***	1.00									
11. CAPEX-TA	0.09***	-0.06- ***	0.03***	-0.05- ***	-0.02	0.03	0.08***	0.09***	-0.12- **	-0.04- **	1.00								
12. CACL	-0.09- ***	0.06***	-0.02	0.07***	0.00	-0.01	-0.11- ***	-0.22- ***	0.08***	0.00	-0.18- ***	1.00							
13. MBV	0.02	0.03***	0.01	0.03*	0.08***	0.04**	0.09***	0.15***	-0.07- ***	0.15***	0.23***	-0.13- ***	1.00						
14. NCFOT-A	0.12***	-0.08- ***	0.02	0.00	-0.03- **	0.13***	0.11***	0.03*	0.04**	0.06***	0.22***	0.06***	0.19***	1.00					
15. PPETA	0.24***	-0.14- ***	0.02	-0.04- **	0.02	0.04**	0.03**	0.10***	0.04**	0.00	0.40***	-0.31- ***	-0.01	0.24***	1.00				
16. ROE	0.06***	-0.01	0.00	-0.03*	-0.06- ***	0.06***	0.08***	0.21***	-0.08- ***	0.04**	0.16***	-0.06- ***	0.36***	0.33***	-0.33*	1.00			
17. ROA	0.08***	-0.05- ***	0.03**	0.02	-0.05- ***	0.09***	0.05***	0.10***	-0.07- ***	0.04**	0.20***	0.14***	0.32***	0.51***	-0.02	0.79***	1.00		
18. LEV	-0.02	0.04***	-0.05- ***	0.00	0.03	0.08***	0.05***	0.27***	-0.01	-0.02	-0.04- **	-0.47- ***	0.01	-0.33- ***	0.13***	0.02	-0.27- ***	1.00	

This table reports correlation coefficients between key variables for a sample of 3,854 firm-year observations covering the period 2001–2014. Please see Table 1 for the variable description. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4
Panel OLS regressions of financial leverage.

Variable	(1)	(2)
Constant	−0.434*** (0.081)	−0.428*** (0.091)
RETIND _{t-1}	−0.002 (0.011)	−0.002 (0.011)
LNNTA _{t-1}	0.082*** (0.010)	0.082*** (0.010)
LNFAE _{t-1}	0.029*** (0.011)	0.030*** (0.011)
CAPEXTA _{t-1}	0.001*** (0.000)	0.002*** (0.000)
CACL _{t-1}	−0.016*** (0.003)	−0.016*** (0.003)
MBV _{t-1}	0.008** (0.003)	0.008** (0.003)
NCFOTA _{t-1}	−0.111*** (0.026)	−0.112*** (0.026)
PPETA _{t-1}	0.000 (0.030)	−0.004 (0.030)
ROA _{t-1}	−0.341*** (0.042)	−0.351*** (0.042)
BD_SIZE _{t-1}		0.002 (0.003)
BD_IND _{t-1}		−0.002 (0.049)
BD_AUDIT _{t-1}		−0.015* (0.009)
BD_WOMEN _{t-1}		0.068 (0.048)
CEO_DUAL _{t-1}		−0.022 (0.016)
OWN_TOP3 _{t-1}		0.000 (0.000)
BIG4 _{t-1}		−0.004 (0.012)
Firms fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adjusted R ²	0.769	0.770
F-statistic	31.876***	31.523***
Firms included	362	358
Observations	3,538	3,502

This table presents panel OLS regressions of financial leverage (LEV). The dependent variable is LEV, which is measured as the ratio of total debt to total assets. Please see Table 1 for the variable description. All explanatory variables are one-period lagged. Firm- and year-fixed effects are included in all regressions. Robust standard errors, which are clustered at the firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

(BD_IND), audit committee size (BD_AUDIT), female directorship (BD_WOMEN), CEO duality (CEO_DUAL), ownership concentration (OWN_TOP3) and audit reputation (BIG4) in Model (2). The coefficients on the industry return (RETIND), the market-to-book ratio (MBV) and the cash flow to total assets ratio (NCFOTA) remain positive and statistically significant, while the coefficients on firm size (LNNTA) and the current ratio (CACL) are still negative and statistically significant. The coefficient on BD_AUDIT is −0.018 and statistically different at the 5% level, suggesting that an increase in the audit committee size will lead to a decrease in firm performance. This finding provides empirical support to Hypothesis 2.3 that predicts the negative relationship between audit committee size and firm performance. The results show that other corporate governance variables are not associated with firm performance. These findings do not provide support for Hypotheses 2.1–2.7, except Hypothesis 2.3.

To test the direct effect of financial leverage on firm performance, we add the financial leverage (LEV) as an independent variable in Model (3). The coefficient on LEV is 0.146 and statistically different from zero at the 1% level, suggesting that an increase in the level of financial leverage will lead to an increase in firm performance. This finding provides empirical support to hypothesis 3 that predicts the positive relationship between financial leverage and firm performance. However, this finding is in contrast to prior studies (see e.g., Chen et al., 2005; Seifert et al., 2005) that document a negative relationship between leverage and firm performance. The coefficients on the industry return (RETIND), the market-to-book ratio (MBV) and the cash flow to total assets ratio (NCFOTA) remain positive and statistically significant, while the coefficient on firm size (LNNTA) and firm age (LNFAE) are negative and statistically significant.

Model (4) presents the estimation results of the full model. The coefficient on LEV is 0.134 and statistically different from zero at the 1% level, suggesting that an increase in the level of financial leverage will lead to an increase in the firm performance, while all

Table 5
Panel OLS regressions of firm performance.

Variable	(1)	(2)	(3)	(4)
Constant	0.348*** (0.079)	0.396*** (0.089)	0.413*** (0.079)	0.457*** (0.089)
RETIND _{t-1}	0.030** (0.014)	0.032** (0.014)	0.032** (0.013)	0.033** (0.013)
LNTA _{t-1}	-0.022** (0.009)	-0.027*** (0.010)	-0.035*** (0.010)	-0.039*** (0.010)
LNFACE _{t-1}	-0.016 (0.011)	-0.013 (0.011)	-0.022** (0.011)	-0.019* (0.011)
CAPEXTA _{t-1}	-0.001* (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001 (0.001)
CACL _{t-1}	-0.008*** (0.003)	-0.008*** (0.003)	-0.003 (0.003)	-0.003 (0.003)
MBV _{t-1}	0.032*** (0.003)	0.032*** (0.003)	0.032*** (0.003)	0.031*** (0.003)
NCFOTA _{t-1}	0.126*** (0.030)	0.117*** (0.030)	0.166*** (0.031)	0.154*** (0.031)
PPETA _{t-1}	-0.045 (0.029)	-0.033 (0.029)	-0.056* (0.029)	-0.043 (0.029)
BD_SIZE _{t-1}		0.001 (0.003)		0.002 (0.003)
BD_IND _{t-1}		0.061 (0.051)		0.058 (0.051)
BD_AUDIT _{t-1}		-0.018* (0.009)		-0.016* (0.008)
CEO_DUAL _{t-1}		-0.011 (0.016)		-0.008 (0.016)
BD_WOMEN _{t-1}		0.058 (0.048)		0.044 (0.048)
OWN_TOP3 _{t-1}		0.000 (0.000)		0.000 (0.000)
BIG4 _{t-1}		-0.015 (0.012)		-0.015 (0.012)
LEV _{t-1}			0.146*** (0.028)	0.134*** (0.028)
Firms fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.421	0.425	0.428	0.431
F-statistic	7.773***	7.752***	7.959***	7.903***
Firms included	362	358	362	358
Observations	3,541	3,503	3,541	3,502

This table presents panel OLS regressions of firm performance. The dependent variable is return on equity (ROE), which is measured as the ratio of earnings before interest and taxes to equity. Please see Table 1 for the variable description. All explanatory variables are one-period lagged. Firm- and year-fixed effects are included in all regressions. Robust standard errors, which are clustered at the firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

corporate governance variables are not associated with firm performance. These findings do not provide support for hypotheses 4. However, these findings are consistent with several prior studies. For example, [Hu and Izumida \(2008\)](#) find no relationship between board size, board independence and female directorship on firm performance for a sample of firms in Japan. [Seifert et al. \(2005\)](#) find that at higher levels of ownership there is no relationship between ownership and firm performance for advanced economies. Moreover, [Chen et al. \(2005\)](#) find no effect of board size, board independence, board audit and CEO duality on firm performance for firms in Hong Kong. [Elsayed \(2007\)](#) finds that CEO duality has no impact on corporate performance, measured as ROA and Tobin's Q, for a sample of publicly listed firms in Egypt during 2000–2004. These results provide evidence to suggest that corporate governance attributes do not necessarily lead to better firm performance.

4.3. The mediating effect of financial leverage

To test Hypothesis 4, which predicts that financial leverage mediates the effect of corporate governance on firm performance, it is important to look at the regression results of Eq. (1) through (4). To test for the presence of the mediating effect, the following conditions must hold: First, the independent variable (i.e., the corporate governance variables) must affect the mediator (i.e., LEV) in Eq. (1). Second, the independent variable (i.e., the corporate governance variables) must have the effect on the dependent variable (i.e., ROE) in Eq. (2). Third, the mediator (i.e., LEV) must affect the dependent variable (i.e., ROE) in Eq. (3). Fourth, if the above three conditions all hold in predicted directions and the effect of independent variable (i.e., the corporate governance variables) on dependent variable (i.e., ROE) in Eq. (4) is weaker than (becomes insignificant) that of Eq. (2), there is evidence for a partial mediator (a full mediator).

Table 6
Panel OLS regressions of financial leverage: Small/large firms subsamples.

Variable	(1) HTA = 0	(2) HTA = 0	(3) HTA = 1	(4) HTA = 1
Constant	−0.229** (0.105)	−0.264** (0.117)	−0.331** (0.138)	−0.342** (0.150)
RETIND _{t-1}	−0.017 (0.017)	−0.016 (0.016)	0.005 (0.014)	0.003 (0.014)
LNTA _{t-1}	0.061*** (0.014)	0.068*** (0.014)	0.063*** (0.015)	0.061*** (0.015)
LNFA _{t-1}	0.026* (0.014)	0.030** (0.014)	0.033** (0.016)	0.029* (0.017)
CAPEX _{t-1}	0.002*** (0.001)	0.002*** (0.001)	0.001 (0.001)	0.001 (0.001)
CACL _{t-1}	−0.017*** (0.003)	−0.017*** (0.003)	−0.015*** (0.004)	−0.015*** (0.004)
MBV _{t-1}	0.003 (0.004)	0.003 (0.004)	0.004 (0.004)	0.005 (0.004)
NCFOTA _{t-1}	−0.013 (0.035)	−0.021 (0.034)	−0.205*** (0.035)	−0.199*** (0.035)
PPETA _{t-1}	−0.006 (0.042)	−0.009 (0.042)	0.041 (0.040)	0.043 (0.040)
ROA _{t-1}	−0.385*** (0.055)	−0.384*** (0.055)	−0.257*** (0.064)	−0.265*** (0.064)
BD_SIZE _{t-1}		−0.004 (0.004)		0.007* (0.004)
BD_IND _{t-1}		−0.071 (0.065)		0.144** (0.067)
BD_AUDIT _{t-1}		−0.005 (0.012)		−0.029** (0.011)
BD_WOMEN _{t-1}		0.164** (0.065)		−0.056 (0.067)
CEO_DUAL _{t-1}		−0.045** (0.022)		−0.003 (0.021)
OWN_TOP3 _{t-1}		0.001* (0.000)		0.000 (0.000)
BIG4 _{t-1}		−0.006 (0.015)		0.003 (0.019)
Firms fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.740	0.746	0.806	0.805
F-statistic	22.715***	22.893***	30.926***	29.954***
Firms included	235	231	202	200
Observations	1,941	1,919	1,597	1,583

This table presents panel OLS regressions of financial leverage (LEV), which is measured as the ratio of total debt to total assets. The large firm size (HTA) dummy variable takes a value of one for an observation with total assets larger than the cross-sectional mean value of total assets, and zero otherwise. Please see Table 1 for the variable description. All explanatory variables are one-period lagged. Firm- and year-fixed effects are included in all regressions. Robust standard errors, which are clustered at the firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

As be seen in Tables 4 and 5, the results suggest that financial leverage does not mediate the effect of corporate governance on firm performance. Overall, the results do not support Hypothesis 4 and indicate that in the context of firms in Thailand, the relationship between corporate governance and firm performance is not mediated by financial leverage.

4.4. Robustness tests

This section discusses the results of some additional tests to check the robustness of the main findings.

4.4.1. Small and large firms

To test whether the effect of corporate governance on financial leverage is asymmetric with regard to firm size, we split the sample in two subsamples based on the cross-section mean value of total assets. A firm size (HTA) dummy variable takes a value of one for an observation with LNTA larger than the cross-sectional mean of LNTA, and zero otherwise. We separately estimate Eq. (1) where the dependent variable is financial leverage for both small (i.e., HTA = 0) and large firm (i.e., HTA = 1) subsamples. The summary statistics for the subsamples are presented in Appendix A.

Table 6 presents panel OLS regressions of financial leverage for both subsamples. Results of panel OLS regressions indicate that for the large firm subsample (HTA = 1), the effect of board independence on the degree of financial leverage is positive and statistically significant ($\beta_{BD_IND} = 0.144$, p -value < 0.05) and that the effect of audit committee size on the degree of financial leverage is

Table 7
Panel OLS regressions of firm performance: Small/large firms subsamples.

Variable	(1) HTA = 0	(2) HTA = 0	(3) HTA = 0	(4) HTA = 0	(5) HTA = 1	(6) HTA = 1	(7) HTA = 1	(8) HTA = 1
Constant	0.502*** (0.103)	0.485*** (0.117)	0.529*** (0.103)	0.515*** (0.118)	0.347** (0.137)	0.433*** (0.151)	0.492*** (0.139)	0.545*** (0.153)
RETIND _{t-1}	0.040** (0.020)	0.046** (0.020)	0.043** (0.020)	0.049** (0.020)	0.013 (0.017)	0.011 (0.017)	0.015 (0.017)	0.013 (0.017)
LNTA _{t-1}	-0.053*** (0.014)	-0.051*** (0.014)	-0.060*** (0.014)	-0.058*** (0.015)	-0.022 (0.014)	-0.021 (0.015)	-0.042*** (0.015)	-0.037** (0.015)
LNFA _{t-1}	-0.013 (0.015)	-0.006 (0.015)	-0.019 (0.015)	-0.012 (0.015)	-0.006 (0.017)	-0.010 (0.017)	-0.013 (0.017)	-0.014 (0.017)
CAPEX _{t-1}	-0.001* (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
CACL _{t-1}	-0.010*** (0.004)	-0.010*** (0.004)	-0.005 (0.004)	-0.006 (0.004)	-0.003 (0.005)	-0.003 (0.005)	0.002 (0.005)	0.002 (0.005)
MBV _{t-1}	0.025*** (0.005)	0.025*** (0.005)	0.026*** (0.005)	0.025*** (0.005)	0.040*** (0.004)	0.040*** (0.004)	0.039*** (0.004)	0.040*** (0.004)
NCFOTA _{t-1}	0.077* (0.042)	0.072* (0.042)	0.104** (0.042)	0.098** (0.042)	0.172*** (0.043)	0.181*** (0.043)	0.237*** (0.044)	0.229*** (0.044)
PPETA _{t-1}	0.019 (0.042)	0.008 (0.042)	0.011 (0.042)	0.003 (0.042)	-0.038 (0.041)	-0.047 (0.041)	-0.058** (0.040)	-0.065 (0.041)
BD_SIZE _{t-1}		0.000 (0.004)		0.000 (0.004)		0.002 (0.004)		0.001 (0.004)
BD_IND _{t-1}		0.069 (0.071)		0.071 (0.071)		0.002 (0.070)		-0.006 (0.070)
BD_AUDIT _{t-1}		-0.009 (0.012)		-0.009 (0.012)		-0.033*** (0.012)		-0.029** (0.012)
BD_WOMEN _{t-1}		0.026 (0.067)		0.007 (0.067)		0.102 (0.067)		0.110* (0.067)
CEO_DUAL _{t-1}		-0.011 (0.023)		-0.006 (0.024)		-0.016 (0.022)		-0.013 (0.022)
OWN_TOP3 _{t-1}		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)
BIG4 _{t-1}		-0.036 (0.016)		-0.036** (0.016)		0.004 (0.020)		0.005 (0.019)
LEV _{t-1}			0.124*** (0.037)	0.113*** (0.038)			0.183** (0.041)	0.132*** (0.039)
Firms fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.371	0.371	0.376	0.375	0.497	0.499	0.507	0.505
F-statistic	5.526***	5.413***	5.613***	5.478***	8.156***	7.994***	8.420***	8.135***
Firms included	235	231	235	231	202	200	202	200
Observations	1,944	1,920	1,944	1,920	1,597	1,583	1,597	1,583

This table presents panel OLS regressions of firm performance. The dependent variable is return on equity (ROE), which is measured as the ratio of earnings before interest and taxes to equity. The large firm size (HTA) dummy variable takes a value of one for an observation with total assets larger than the cross-sectional mean value of total assets, and zero otherwise. Please see Table 1 for the variable description. All explanatory variables are one-period lagged. Firm- and year-fixed effects are included in all regressions. Robust standard errors, which are clustered at the firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

negative and statistically significant ($\beta_{BD_AUDIT} = -0.029, p\text{-value} < 0.05$). Others corporate governance variables are not associated with financial leverage for the large firm size subsamples. For the small firm size subsamples (HTA = 0), female directorship has a positive effect on the degree of financial leverage ($\beta_{BD_WOMEN} = 0.164, p\text{-value} < 0.05$) while CEO duality has a negative effect on the degree of financial leverage ($\beta_{CEO_DUAL} = -0.045, p\text{-value} < 0.05$).

To test whether the effects of corporate governance and financial leverage on firm performance are asymmetric with regard to firm size, we divide the sample in two subsamples based on the cross-section mean value of total assets. We separately estimate Eqs. (2)–(4), where the dependent variable is ROE for both small (i.e., HTA = 0) and large firm (i.e., HTA = 1) subsamples.

Table 7 presents panel OLS regressions of firm performance. Models (1) and (5) are baseline OLS regressions, including only control variables. The pattern of the results for both subsamples is similar to that of the full sample.

The results of Models (2) and (6), which are panel OLS regressions of Eq. (2), indicate that the effect of audit committee size on the firm performance is insignificant for the small firm subsample (HTA = 0) and is negative and statistically significant ($\beta_{BD_AUDIT} = -0.033, p\text{-value} < 0.01$) for the large firm subsample (HTA = 1), respectively.

The results of Models (3) and (7), which are panel OLS regressions of Eq. (3), indicate that the effect of financial leverage on the firm performance is positive and statistically significant for both large firms ($\beta_{LEV} = 0.183, p\text{-value} < 0.05$) and small firms ($\beta_{LEV} = 0.124, p\text{-value} < 0.01$).

The results of Models (4) and (8), which are panel OLS regressions of Eq. (4), indicate that the effect of audit committee size on the firm performance is negative and statistically significant ($\beta_{BD_AUDIT} = -0.029, p\text{-value} < 0.05$) for the large firm sample only

Table 8
Panel OLS regressions of firm performance: An alternative measurement of firm performance.

Variable	(1)	(2)	(3)	(4)
Constant	0.270*** (0.036)	0.292*** (0.041)	0.263*** (0.036)	0.283*** (0.041)
RETIND _{t-1}	0.013** (0.006)	0.013** (0.006)	0.013** (0.006)	0.013** (0.006)
LNTA _{t-1}	-0.020*** (0.004)	-0.023*** (0.004)	-0.019*** (0.004)	-0.022*** (0.004)
LNFACE _{t-1}	-0.012** (0.005)	-0.011** (0.005)	-0.011** (0.005)	-0.010** (0.005)
CAPEXTA _{t-1}	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CACL _{t-1}	-0.003** (0.001)	-0.003** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
MBV _{t-1}	0.010*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.010*** (0.001)
NCFOTA _{t-1}	0.114*** (0.014)	0.110*** (0.014)	0.110*** (0.014)	0.105*** (0.014)
PPETA _{t-1}	-0.049*** (0.013)	-0.040*** (0.013)	-0.048*** (0.013)	-0.039*** (0.013)
BD_SIZE _{t-1}		0.000 (0.001)		0.000 (0.001)
BD_IND _{t-1}		0.011 (0.023)		0.012 (0.023)
BD_AUDIT _{t-1}		0.000 (0.004)		0.000 (0.004)
BD_WOMEN _{t-1}		0.008 (0.022)		0.010 (0.022)
CEO_DUAL _{t-1}		-0.009 (0.007)		-0.009 (0.007)
OWN_TOP3 _{t-1}		0.000 (0.000)		0.000 (0.000)
BIG4 _{t-1}		-0.006 (0.006)		-0.006 (0.006)
LEV _{t-1}			-0.016 (0.013)	-0.019 (0.013)
Firms fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.534	0.536	0.535	0.536
F-statistic	11.689***	11.562***	11.671***	11.549***
Firms included	362	358	362	358
Observations	3,541	3,503	3,541	3,503

This table presents panel OLS regressions of firm performance. The dependent variable is return on assets (ROA), which is measured as the ratio of earnings before interest and taxes to total assets. Please see Table 1 for the variable description. All explanatory variables are one-period lagged. Firm- and year-fixed effects are included in all regressions. Robust standard errors, which are clustered at the firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

(HTA = 1), suggesting that large firms with smaller audit committee size tend to have better firm performance than large firms with larger audit committee size. This result is consistent with prior studies (Aldamen et al., 2012), showing that smaller audit committees with more experience and financial expertise are more likely to be associated with positive firm performance. Audit reputation is negative and statistically significant ($\beta_{BIG4} = -0.036$, p -value < 0.05) for the small firm subsample only (HTA = 0). The results also indicate that the positive effect of financial leverage on firm performance is evident for both the large firm subsample ($\beta_{LEV} = 0.132$, p -value < 0.01) and the small firm subsample ($\beta_{LEV} = 0.113$, p -value < 0.01).

As be seen in Tables 6 and 7, the results suggest that financial leverage mediates the effect of audit committee size on firm performance for the large firm subsample. Our results indicate that financial leverage is a partial mediator since the coefficient of the audit committee size decreases by 12.12% [(0.029 - 0.033)/0.033].

4.4.2. An alternative measure of firm performance

Several scholars (Huang et al., 2015; Vithessonthi and Tongurai, 2015) use return on assets (ROA), measured as the ratio of earnings before interest and taxes to total assets, to proxy for firm performance. We therefore test the robustness of the results by using ROA as an alternative measure of firm performance. We estimate panel OLS regressions for the full sample as well as for several subsamples. Table 8 presents panel OLS regressions of ROA for the full sample. As can be seen in Table 8, the pattern of results is generally unchanged. That is, the coefficients on corporate governance and financial leverage remain statistically insignificant.

Table 9 presents panel OLS regressions of ROA for small and large firm subsamples. The results shown in Table 9 indicate that the coefficients on corporate governance and financial leverage remain statistically insignificant for both subsamples. These results

Table 9
Panel OLS regressions of firm performance: Small/large firms subsamples.

Variable	(1) HTA = 0	(2) HTA = 0	(3) HTA = 0	(4) HTA = 0	(5) HTA = 1	(6) HTA = 1	(7) HTA = 1	(8) HTA = 1
Constant	0.371*** (0.049)	0.350*** (0.056)	0.363*** (0.049)	0.341*** (0.056)	0.211*** (0.057)	0.252*** (0.063)	0.215*** (0.059)	0.255*** (0.064)
RETIND _{t-1}	0.017* (0.009)	0.019** (0.009)	0.017* (0.009)	0.018* (0.009)	0.008 (0.007)	0.008 (0.007)	0.008 (0.007)	0.008 (0.007)
LNTA _{t-1}	-0.038*** (0.007)	-0.038*** (0.007)	-0.036*** (0.007)	-0.035*** (0.007)	-0.013** (0.006)	-0.011* (0.006)	-0.013** (0.006)	-0.012* (0.007)
LNFAGE _{t-1}	-0.009 (0.007)	-0.007 (0.007)	-0.007 (0.007)	-0.006 (0.007)	-0.007 (0.007)	-0.007 (0.007)	-0.007 (0.007)	-0.007 (0.007)
CAPEXTA _{t-1}	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001* (0.000)	0.000 (0.000)	-0.001* (0.000)	0.000 (0.000)
CACL _{t-1}	-0.005*** (0.002)	-0.005*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)
MBV _{t-1}	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.013*** (0.002)	0.013*** (0.002)	0.013*** (0.002)	0.013*** (0.002)
NCFOTA _{t-1}	0.103*** (0.019)	0.102*** (0.019)	0.096*** (0.020)	0.094** (0.020)	0.113*** (0.018)	0.116*** (0.018)	0.115*** (0.019)	0.117*** (0.019)
PPETA _{t-1}	-0.057*** (0.020)	-0.060*** (0.020)	-0.056*** (0.020)	-0.059** (0.020)	-0.033* (0.017)	-0.035** (0.017)	-0.033* (0.017)	-0.036** (0.017)
BD_SIZE _{t-1}		0.001 (0.002)		0.001 (0.002)		-0.002 (0.002)		-0.002 (0.002)
BD_IND _{t-1}		0.024 (0.033)		0.023 (0.033)		-0.024 (0.029)		-0.024 (0.029)
BD_AUDIT _{t-1}		0.004 (0.006)		0.004 (0.006)		-0.007 (0.005)		-0.007 (0.005)
BD_WOMEN _{t-1}		-0.003 (0.032)		0.003 (0.031)		0.002 (0.028)		0.002 (0.028)
CEO_DUAL _{t-1}		-0.013 (0.011)		-0.015 (0.011)		0.000 (0.009)		0.000 (0.009)
OWN_TOP3 _{t-1}		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)
BIG4 _{t-1}		-0.010 (0.008)		-0.010 (0.008)		-0.002 (0.008)		-0.002 (0.008)
LEV _{t-1}			-0.033* (0.018)	-0.035* (0.018)			0.005 (0.018)	0.003 (0.018)
Firms fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.540	0.536	0.542	0.537	0.579	0.578	0.579	0.578
F-statistic	10.029***	9.643***	10.037***	9.654***	10.973***	10.628***	10.917***	10.574***
Firms included	235	231	235	231	202	200	202	200
Observations	1,944	1,920	1,944	1,920	1,597	1,583	1,597	1,583

This table presents panel OLS regressions of firm performance. The dependent variable is return on assets (ROA), which is measured as the ratio of earnings before interest and taxes to total assets. The large firm size (HTA) dummy variable takes a value of one for an observation with total assets larger than the cross-sectional mean value of total assets, and zero otherwise. Please see Table 1 for the variable description. All explanatory variables are one-period lagged. Firm- and year-fixed effects are included in all regressions. Robust standard errors, which are clustered at the firm level, are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

suggest that the findings of the impact of corporate governance on firm performance are sensitive to measures of firm performance.

5. Discussion

Key findings can be summarized as follows. First, corporate governance is not associated with financial leverage. This finding is different to prior studies (Berger et al., 1997; Wen et al., 2002) that report the existence of the relationship between corporate governance and financial leverage.

Second, for large firms, the relationship between board independence and financial leverage is positive. This result is consistent with Berger et al. (1997). One plausible explanation or the positive relationship is that the independent directors might be able to address the firm’s under-leverage issue that may exist when the manager is too risk averse. The independent directors with valuable networks may help the firm tap into external financing sources. This line of reasoning is in line with prior studies such as that of Berger et al. (1997).

Third, for large firms, audit committee size is negatively associated with financial leverage. This finding is similar to prior studies (Chang et al., 2016). This negative effect appears to suggest that firms with more audit committee members are more likely to be relatively more conservative with respect to a capital structure choice, thereby leading to lower financial leverage.

Fourth, small firms with CEO duality have lower financial leverage than small firms without CEO duality. This finding seems to support the notion that the board of directors is dominated by CEO duality. Under such circumstances, the CEO-chairman who is

more risk-averse could pursue a low leverage policy that may reduce both risk and returns of the firm.

Fifth, for small firms, more female directors are associated with higher financial leverage. Female directors might have better communication skills than their male counterparts. As a consequence, the female directors have better chances to convince the manager and the board to have higher financial leverage.

Sixth, corporate governance is not associated with firm performance. This finding is different to prior studies (Chen et al., 2005; Jackling and Johl, 2009; Nguyen, 2011) that report the existence of the relationship between corporate governance and firm performance.

Seven, for large firms, audit committee size has a negative effect on firm performance, which is inconsistent with prior studies such as that of Aldamen et al. (2012) who show that smaller audit committees with financial expertise and more experience and are more likely to be associated with positive firm performance. Better internal control mechanisms induced by the firm's audit committee may mitigate upwards earnings managements, thereby lowering firm performance in the short run.

Eight, for small firms, audit reputation has a negative effect on firm performance. Auditors from the large international auditing firms may have higher audit standards than small local auditing firms. The high quality auditing processes might prevent the occurrence of earnings management/manipulation.

Ninth, financial leverage is positively related to firm performance, measured as ROE, for the full sample and the small and large firm size subsamples. This finding is in line with prior studies. One plausible reason for positive relationship is that creditors may monitor the firm better than outside shareholders. Better monitoring (from the creditors) may mitigate over investment problems (e.g., investments in value-destroying projects), thereby increasing firm performance (Berger and Udell, 2006; Harvey et al., 2004). However, it is important to note that some studies (Antonioni et al., 2008; Vithessonthi and Tongurai, 2015) show that the effect of financial leverage on firm performance is negative.

Finally, the results find that the financial leverage partially mediates the relationship between corporate governance and firm performance for the large firm subsample. This finding is novel because prior studies have not examined the mediating role of financial leverage.

6. Conclusion

Corporate governance is one of the hottest topics, especially in the aftermath of firm failures and/or a banking/financial crisis. Two important questions have often been asked: First, can strong corporate governance reduce the firm's risk (e.g., investment risk and financing risk)? Second, do firms with strong corporate governance perform better those with weak corporate governance? While empirical results appear to be mixed, many regulators around the world have firm beliefs that strong corporate governance would reduce the probability of the firm taking on excessive risk (e.g., over-leveraged) and enhance firm performance. In this paper, we use a large sample that covers non-financial firms listed in Thailand during the period 2001–2014 to shed light on of the relationships between corporate governance, financial leverage, and firm performance. We find that for an average firm, corporate governance (i.e., board size, board independence, audit committee size, female directorship, CEO duality, ownership concentration, and audit reputation) has no effect on leverage and performance. However, we find that leverage partially mediates the effect of audit committee size on firm performance for large firms only. To the best of our knowledge, we are one of the first to show that corporate governance exerts the indirect effect on firm performance via financial leverage for firms in an emerging market economy.

Acknowledgements

This paper is a revised and abridged version of the first author's doctoral dissertation at Khon Kaen University. The first author is grateful to her dissertation committee, Suntharee Lhaopadchan, Paweena Kongchan, Nongnit Chancharat, and Chaiporn Vithessonthi, for their guidance and suggestions.

Appendix A. Summary statistics for subsamples

This table reports summary statistics for key variables for the subsamples (i.e., the large firm size and small firm size samples) of 3,854 firm-year observations over the period 2001–2014. Please see Table 1 for variables description. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

	Large (1)		Small (2)		Mean Difference (1)–(2)
	Mean	SD.	Mean	SD.	
RETIND	0.107	0.350	0.095	0.351	0.012
LNTA	9.358	0.963	7.061	0.613	2.297***
LNFACE	2.508	0.667	2.280	0.795	0.228***
CAPEXTA	6.420	6.178	5.367	5.897	1.053***
CACL	1.745	1.352	2.488	1.993	−0.743***
MBV	1.778	1.264	1.474	1.148	0.304***

NCFOTA	0.074	0.098	0.075	0.101	−0.001
PPETA	0.389	0.234	0.371	0.212	0.018**
LEV	0.304	0.193	0.202	0.200	0.102***
BD_SIZE	11.053	2.388	9.907	2.158	1.146***
BD_IND	0.351	0.096	0.358	0.089	−0.007**
BD_AUDIT	3.091	0.422	3.026	0.380	0.065***
BD_WOMEN	0.143	0.121	0.184	0.148	−0.041***
CEO_DUAL	0.155	0.362	0.187	0.390	−0.032***
OWN_TOP3	57.614	18.714	56.018	18.328	1.596***
BIG4	0.710	0.454	0.351	0.477	0.359***
ROE	0.188	0.151	0.130	0.160	0.058***
ROA	0.087	0.069	0.073	0.085	0.014***

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