Financial Experience and Boards of Directors: An Empirical Assessment of Impact on Stock Price Synchronicity, Cash Holding and Payout Policy

May Abdulrahman Al Abdulqader

Business School

Cardiff University

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Abstract

This thesis examines the effect of directors' experience on stock price synchronicity, cash holding and payout policy by focusing on two financial related experiences: namely, accounting and non-accounting financial experience. Using non-financial firms from the S&P 1500 database between 1999 and 2017, this study provides new evidence that stock price synchronicity reduces with more accounting financial experience on board, supporting the argument that directors with accounting financial experience enhance the disclosure of firm-specific information, thereby, enhancing firms' informational environment. The relationship is reported to be non-heterogeneous across different types of corporate governance. Furthermore, a difference-in-difference test concludes that the study results are not driven by endogeneity. Moreover, the relationship between financial-experts on board and stock price synchronicity is robust to other board characteristics and sample settings. The study also reveals the ability of financial-expert directors to reduce firm cash holding in support of the flexibility hypothesis. Financial experts on board also enhance firm excess cash profitability and market-to-book value. This finding is robust to controlling board characteristics and different cash holding measures. However, the relationship varies in terms of firms different measures of corporate governance and levels of financial constraint. Accounting financial-experts were also found to increase firm payouts in support of the outcome hypothesis. The results are robust to controlling board characteristics and sample setting. In addition, results also show the effect of accounting financial-experts on payout to be more prominent in firms with weak corporate governance mechanisms and those facing financial constraints. Finally, additional investigation reveals that accounting financial-experts on board are more likely to pay shareholders in the form of repurchase, rather than dividends, in which emphasis is on the financial-experts' role in enhancing board monitoring through the influence of distributing free cash flow through non-pre-committed shareholders' payments.

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Dedication

To My Family

This thesis is dedicated to my parents and husband for their endless love and support and to my kids for inspiring me to always do my best.

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Chapter 1: Introduction

1.1. Rationale of thesis

Following several accounting scandals in the US, the Sarbanes-Oxley (2002) Act emphasises the need for financial experts to serve on the boards of directors under the assumption that "an understanding of generally accepted accounting principles and financial statements" enhances the competence of the board and its ability to protect shareholders' interests[1]. Specifically, the Sarbanes-Oxley (2002, Sec. 407) requires "each issuer (...) to disclose whether or not, and if not, the reason, therefore, the audit committee of that issuer is comprised of at least one member who is financial expert"[2]. While regulations of countries mainly focus on increasing financial experience in firms' audit committees, recent empirical evidence highlights that the trend of financial-experts in firms increases not only on audit committees, but also on boards of directors (Huang et al. 2012; Minton et al. 2014)[3].

In the event of a corporate scandal or financial crisis, blame is first generally attributed to the corporate governance system of a firm. Given their highest authority in the firm governance system, the board of directors play a significant role in establishing the firm policies and in decision-making (Adams and Ferreira 2007). Recent corporate governance literature highlight the most effective board composition mainly targeting directors' independence and diversity (in terms of professional background, age, gender and ethnicity) (Klein 2002; Ryan and Wiggins 2004; Brick et al. 2006; Fich and Shivdasani 2006; Fernandes 2008; Belkhir 2009). As the fraction

[1] See Section 407 of the Sarbanes-Oxley (2002) Act (definition of audit committee financial-experts). Similarly, all major stock exchanges have introduced listing requirements on director financial literacy. See also the governance survey by Jensen, Murphy, and Wruck (2004), e.g. recommendation R-36.

[3] For example, Huang, Q. et al., 2014. The role of investment banker directors in M&A. *Journal of Financial Economics* 112(2), pp. 269-286 show that the number of non-financial firms appointing investment bankers on board rises monotonically over time. Specifically, they show that the percentage of firms that has at least one investment banker on board jumped from 17.3% in 1998 to 29.7% in 2008. Moreover , Minton, B. A. et al., 2014. Financial expertise of the board, risk taking, and performance: Evidence from bank holding companies. *Journal of Financial and Quantitative Analysis* 49(02), pp. 351-380 indicate that, in their sample of financial institutions, including all US banks, there is an increase in banks independent directors with financial experience from 20% in 2003 to 26% in 2008.

of financial expertise on the board of directors increases, studies examining the board of directors' financial experience are generally very limited and concentrated largely in the banking and financial services industry (Fernandes and Fich 2009; Minton et al. 2011; Tseng et al. 2012; Minton et al. 2014) or commercial banking and investment banking experience (Kroszner and Strahan 2001; Byrd and Mizruchi 2005; Tseng et al. 2012; Huang et al. 2014; Kang and Kim 2016). Exploring how directors' financial expertise effect on firms' outcome is an important topic in the modern corporation, yet there are very few studies in this area. This study, therefore, investigates, for the first time, financial experience on the board of directors and its effect on stock price synchronicity along with two main board financial decisions relating to cash holding and payout policy.

Prior literature on corporate governance also highlights that directors with financial experience on board can affect board monitoring and control (McMullen and Raghunandan 1996; Xie et al. 2003; Abbott et al. 2004; Agrawal and Chadha 2005; DeFond et al. 2005; Güner et al. 2008; Fernandes and Fich 2009; Huang et al. 2014). On this issue, previous studies delineate that directors with financial experience provide better financial reporting (McDaniel et al. 2002; Mangena and Pike 2005; Mangena and Tauringana 2007), forecasting (Karamanou and Vafeas 2005), earning management (Klein 2002; Bédard et al. 2004), finance and investment policies (Güner et al. 2008) and firm performances (Davidson et al. 2004; Fernandes and Fich 2009; Minton et al. 2011; Francis et al. 2012a; Minton et al. 2014) and link negatively to firm engaging in earnings management (Xie et al. 2003), accounting scandals (Agrawal and Chadha 2005) and financial restatements (Abbott et al. 2004).

Pertinently, in recent financial and economic literature, the discussion around what determines firms' stock price synchronicity has attracted considerable attention (Francis et al. 2012b). For example, Roll (1988) argues that the degree to which share prices move together depends on a number of factors relating to the way in which firm-specific information, as well as industry- and market-wide information, is incorporated into the share price. He also argues that market- and industry-wide news explains only a small part of stock price variations. According to Bushman et al. (2004), the amount of firm-specific information available to those outside publicly traded firms defines the level of corporate transparency and, thus, firms are less

synchronised when adopting superior disclosure strategies (Song 2015). Interestingly, Roll (1988) study has motivated numerous follow-up studies to examine the relationship between stock price synchronicity and earnings effectiveness (Durnev et al. 2003), capital budgeting (Durnev et al. 2004), corporate transparency (Jin and Myers 2006), voluntary disclosure (Haggard et al. 2008), earning management (Hutton et al. 2009), audit quality (Gul et al. 2010), International Financial Reporting Standards (IFRS) adoption (Kim and Shi 2012), institutional investors (An and Zhang 2013), liquidity (Chan et al. 2013b) corporate governance (Farooq and Ahmed 2014) ownership structure (Gul et al. 2010; Boubaker et al. 2014) and mutual-fund (Jiang et al. 2016).

A large body of research also indicates that composition of the board of directors affects firms' information environment (Vafeas 2000; Cheng and Courtenay 2006; Kanagaretnam et al. 2007; Lim et al. 2007; Rutherford and Buchholtz 2007; Ferreira et al. 2011; Gul et al. 2011) and decision making (Stearns and Mizruchi 1993; Ahmed and Duellman 2007; García Lara et al. 2007; Fields et al. 2012). An effective board makes well informed and high-quality decisions (FRC 2011) and directors with financial expertise are able to obtain financial information at lower costs and may, therefore, be more capable of monitoring the firm's top management more effectively (Harris and Raviv 2008). Previous studies show that the effect of financial expertise on firm's outcome extends beyond being better monitors. According to Adams and Ferreira (2007), directors consume most of their time in the firm serving on their advisory role rather than their monitoring role. When studying the board of directors advisory role, Huang et al. (2014) conclude that directors with financial-expertise are associated with better Mergers and Acquisition (M&A) opportunities and lower costs of the deals. Moreover, Dionne and Triki (2005) show that financial expertise encourages firm risk hedging. This study contends that for financial-experts to govern and advise effectively, it is essential to develop a more robust corporate and financial information environment. Thus, over time, the firm will experience improvement in the quality of their information environment. Hence, the study hypotheses that the fraction of financial-expert directors on board are negatively related to firm stock price synchronicity. This study, therefore, aims to address an important, but still unanswered, question of whether the financial expertise of board directors explains the firms' stock price synchronicity.

Board of directors also has a major role in monitoring managerial decisions on cash management and the distribution of profit to shareholders. During periods of economic growth, a firm's cash holding increases and it is the duty of managers to make strategic decisions about the appropriate way to manage the firm cash reserves, whether to distribute it to shareholders, use it internally or to use it for external acquisition or continue holding their extra cash (Harford et al. 2008). From a logical economic perspective, excess cash holds benefit firms by limiting their transactions cost and funding their capital investment. This results in reducing firms' loss from underinvesting due to shortage in free cash flow (Kim et al. 1998; Opler et al. 1999; Mikkelson and Partch 2003; Ozkan and Ozkan 2004). Cash holding provides firms with access to liquidity (Almeida et al. 2014) mainly during a financial crisis or in times of shortage of access to credit (Campello et al. 2011). Over recent years, firms worldwide have shown an extraordinary increase in their cash holding. According to Bates et al. (2009), in the US, the cash to assets ratio for industry firms more than doubled during the period between 1980 and 2006[4].

However, from the perspective of the agency theory, where ownership and control are separated, a firm's corporate governance plays a vital role in the amount excess cash held by firms. After all, theory suggests that better-governed firms will be more keen to distribute free cash to shareholders to limit the appearance of agency problem due to managers' misuse of free cash flow (Jensen 1986; Dittmar and Mahrt-Smith 2003). Managers have a strong incentive to hold more free cash flow. Thus, corporate governance strength was found to have a direct effect on excess cash holdings in a firm (Dittmar and Mahrt-Smith 2003). Extended studies provide sufficient evidence on the relationship between shareholders' right and corporate cash holding (Dittmar and Mahrt-Smith 2003; Lee et al. 2003; Kalcheva and Lins 2007; Al-Najjar 2013) and show that countries with low shareholder protection retain more

[4] The concept of building up a large cash reserve is also seen in the UK market (Florackis, C. and Sainani, S., 2018). How do chief financial officers influence corporate cash policies? *Journal of Corporate Finance* 52, pp. 168-191. note an increase in the average cash holdings of UK firms from the period between 1999-2011. Moreover, Iskandar-Datta, M. E. and Jia, Y., 2012. Cross-country analysis of secular cash trends. *Journal of Banking and Finance* 36(3). cross country analysis shows an increase of cash holding in France, Australia, Canada and Germany for the period between 1991and 2007.

cash. However, when studying the US market, a country with high shareholder protection, Harford et al. (2008) show that weak corporate governed structured firms have lower cash reserves. Nevertheless, firms with excess cash and weak corporate governance are found to increase their capital expenditures and acquisitions and reduce their profitability and valuation.

Board of directors is also mainly responsible for corporate governance. The demography of board of directors reveals a direct effect on firm cash holding. (Ozkan and Ozkan 2004; Chen 2008; Harford et al. 2008; Chen and Chuang 2009; Kusnadi 2011; Boubaker et al. 2015; Al-Najjar and Clark 2017). Previous studies also demonstrates the effect financial expertise on board has over firm financial decisions (Güner et al. 2008; Minton et al. 2011; Minton et al. 2014). Hence, this study focuses, for the first time, on how financial-experts on board affect the propensity to stockpile cash. In doing so, the study raises the following questions: (1) Do financial-expert directors lead managers to reduce their stockpile cash reserves? (2) How does the presence of financial-experts on board affect the managers' deployment of free cash? (3); Are the differences in cash deployment reflected in differences in firm profitability and, eventually, firm valuation?

Previous studies in relation to mitigating agency conflict of interest and firm management of cash holding focused on two main contradicting hypotheses; the flexibility hypothesis and the spending hypothesis. On one hand, according to the financial flexibility hypothesis, finance flexibility allows managers to have substantial financial reserves to quickly finance suitable investments (Jensen 1986). However, self-interested managers withhold excess cash to help survive unexpected adversity (Easterbrook 1984; Jensen 1986). According to the flexibility hypothesis, the less effective control is over managers, the more managers stack cash reserves. Thus, the study hypothesises that the fraction of financial-expert directors is negatively linked to cash holding. On the other hand, The spending Hypothesis argue in line with the agency theory that self-interested managers prefer spending firm excess cash flow rather than holding it (Jensen and Meckling 1976). Contradicting the flexibility hypothesis, it suggests that the more effective monitoring is over managers, the more firm will retain cash. In light of the spending hypothesis the study hypothesises that the fraction of financial-expert directors is positively linked to cash holding.

Conversely, on the other side of managerial cash holding decision, managers also decide on firm payout policy. Payout policy is a strategic plan used by directors where they decide on whether to distribute cash to shareholders or accrue it for future investment. In line with agency theory, dividend policy can be used as a mechanism to mitigate agency problem. According to Jensen (1986), dividend limits the ability of managers to misuse excess cash. Moreover, Easterbrook (1984) argued that dividend payment reduces managers and shareholders agency problem through subjecting the firm to external market analysis. According to Jiraporn et al. (2011), dividend payments are positively associated with governance quality. The board of directors is another governance mechanism to control agency problem. According to Boumosleh and Cline (2015), maximised firm value requires a control system of combining governance mechanism and dividend policy.

According to John and Knyazeva (2006), firms with strong internal and external governance are found to pay fewer dividends. Moreover, Hu and Kumar (2004) studied management entrenchment and payout policy and discovered that firms with less control over managers pay more dividends. Additionally, Jiraporn and Ning (2006) propose that firms pay higher dividends where shareholder rights are more suppressed. However, other studies argue on the basis of a positive relationship between firm corporate governance strength and payout policies. For example, Adjaoud and Ben-Amar (2010) found firms with stronger corporate governance pay more dividends. Moreover, Jiraporn et al. (2011) finding implies that investors in firms with strong corporate governance are more able to force managers to distribute cash through dividend payout, in view of the conflict arises on the relationship between firm corporate governance strength and payout policy.

Extant literature also delineates that one of the main determinants of the firm payout policy lies in their internal governance being applied through the effectiveness of the board of directors composition (Hu and Kumar 2004; Jiraporn and Ning 2006; Setia-Atmaja 2010; Abor and Fiador 2013; Yarram and Dollery 2015; Chen et al. 2017). This study investigates board demography, focusing on how directors' financial experience influences the firm payout policy.

In addition, determining the impact of financial-experts on board in deciding payout policy is undoubtedly significant. The study contributes to the steadily growing

literature on the role of financial-experts in corporate governance, particularly, how financial-experts affect the firm decisions on firm monitoring policy. Specifically, this study explores whether having financial-expert directors influences firm long-term payout decisions.

There are two conflicting views, grounded on the agency theory, explaining the relationship between firm corporate governance and payout decisions: the outcome view and the substitute view. The outcome view highlights the managers' incentives to retain more cash to serve their own interests and emphasises the role of strong governance to induce dividend payments (Jensen 1986; La Porta et al. 2000). Where, the substitute view argument is based on the need for firms to establish reputation is higher for firms with weak shareholder protection (La Porta et al. 2000). A follow up study by Jiraporn and Ning (2006) investigating the relationship between shareholders' right and dividend policy, establish that firms with weak shareholders' right pay more dividend. Based on the two conflicting arguments on the effect of corporate governance on dividends payouts the study hypothesis that there is a positive relationship between the fraction of financial-expert directors on board and payout policy (outcome theory) and there is a negative relationship between the fraction of financial-expert directors on board and payout policy (substitute theory).

Using US stock market S&P 1500, this thesis empirically tests the relationship between financial-experts on board and firm stock price synchronicity, cash holding, and payout policy. Following prior studies (see, e.g., Güner et al. (2008); Minton et al. (2014); Fernandes and Fich (2016), financial-expert directors are defined as those who (1) have prior experiences as executives in banking and financial institutions, finance-related positions in nonfinancial firms, or professional investors (henceforth, "*accounting financial directors*") and (2) those who have non-accounting positions supervising the financial reporting functions, such as Presidents and CEOs (henceforth, "*non-accounting financial directors*").

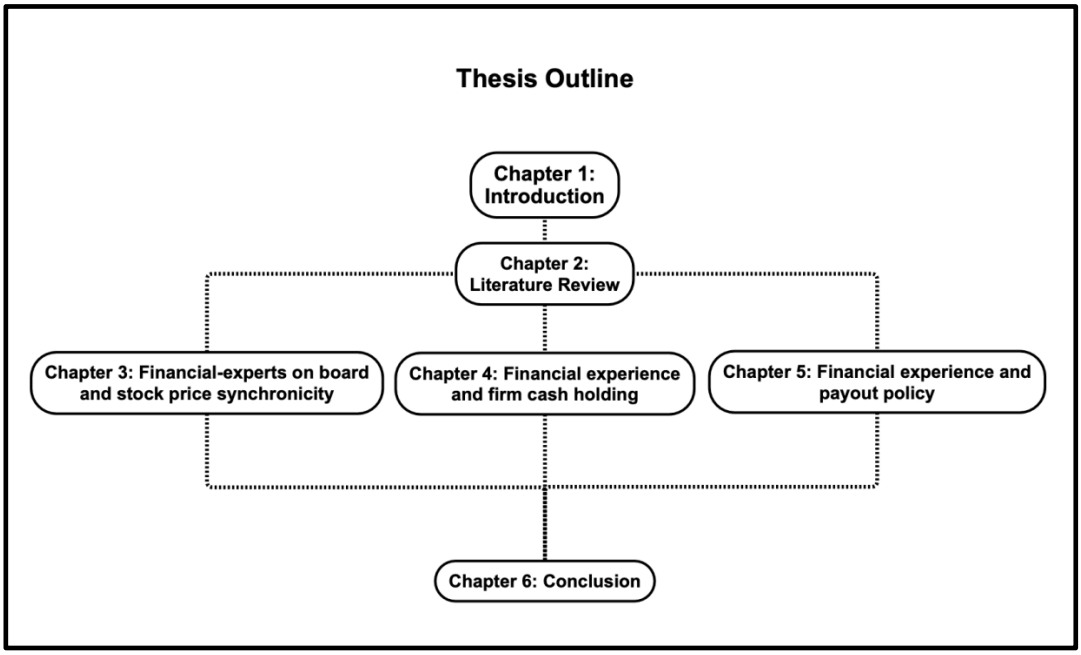
The remainder of this chapter provides a summary of the study's main findings and contribution to the literature, where it highlights the main results and contribution of the relationship between financial-experts on board and firm stock price synchronicity, cash holding and payout policy.

1.2. Structure of the thesis

The study is structured into six chapters as follows:

Following the introduction in this chapter, Chapter 2 presents the relevant literature to this thesis on board of directors' main role, stock price synchronicity, cash holding and payout policy. Chapter 3 presents the first empirical chapter of the thesis on financial experience effect on firm stock price synchronicity. Chapter 4 presents the second study of the thesis on financial experience role in explaining firm cash holding. Chapter 5 offers the third and final study of the thesis on the financial experience and payout policy. Finally, Chapter 6 concludes the thesis by summarising the main research findings, limitation of the thesis and offers recommendations for future empirical research.

Figure 1: Thesis Outline



1.3. Findings and contribution to literature

1.3.1. Financial experience and stock price synchronicity

Chapter 3 focuses on empirically investigating the relationship between directors' financial experience and firm stock price synchronicity using a sample of 1,078 US publicly traded non-financial firms between 1999 and 2016. The main findings in the chapter conclude that the proportion of financial-experts on board has a negative effect on firm stock price synchronicity. The adverse effects particularly appear when financial-expertise is measured by directors' previous accounting financial experience, where directors' non-accounting financial experience has no significant effect. Moreover, the study applies several robustness checks to validate the study's main results. The study's main results are robust to other board attributes, stringent sample (minimum of 50 weeks of observations per year instead of 30), the presence of top firms in the sample and the presence of unusual stock price behaviour due to the recent financial crisis.

A major concern arising from this study is that the relationship between directors' financial experience and firm stock price synchronicity could be endogenous. For example, the estimates could be biased by omitted variables that affect both the appointment of financial-expert directors and stock price informativeness. The results could be subject to the reverse causality concern if firms with superior information environment are more attractive and capable of employee directors with higher qualifications and financial experience. This study uses the difference-in-difference approach to address this concern. The study tests the plausibly exogenous increase in the fraction of financial-expert directors on boards brought by the 2003 NYSE and NASDAQ listing rules, instructing that boards without majority independence must appoint new independent directors. Since boards without financial-expert directors prior to the enactment are more likely to appoint new financial directors following the obligatory changes, the study found that in the one and two years after the new listing rules took place, such boards experience a marginally significant reduction in price synchronicity. This evidence suggests that endogeneity is unlikely to fully explain the study results.

To obtain further insight into financial-experts' effect on firm stock price synchronicity, the study then explores the cross-sectional heterogeneity in the relation in question across firms with different governance characteristics. Interestingly, the study found that the relationship between directors with financial experience and stock price synchronicity is stronger among firms with a chairman-CEO (duality), low institutional ownership, and a low threat of takeover (measured by the antitakeover index), where governance and monitoring are most needed. This evidence is in line with better monitoring by financial-expert directors improving firms' information environment. Additionally, the study examines the types of directors' effect on the relationship between financial-experts and firm stock price synchronicity and shows that the significant relation stems from those financial-expert directors who are independent and have many outside directorships. Finally, according to Kothari et al. (2009), managers tend to delay the disclosure of bad news to investors in the presence of a conflict of interest, which results in stock crash risk when all bad news is suddenly released (Jin and Myers 2006). They argue that better transparent environment reduces firm crash risk. However, the study failed to obtain any effect of financial-experts on reducing the managers' incentive on withholding bad news.

This study contributes to the financial literature on the effectiveness of financial-expert directors in several ways. First, the new trend of increasing financial expertise on the board of directors provides an opportunity to embed the financial expertise perspective into the corporate board of directors. Recent studies have also considered the financial expertise of corporate audit committees (McDaniel et al. 2002; Davidson et al. 2004; Mangena and Pike 2005; Carcello et al. 2006b) or on banks' boards (Fernandes and Fich 2009; Minton et al. 2014). However, it is the board of directors who have main responsibility of supervising the firm's financial reporting process (Klein 2002). In view of these responsibilities, this study contributes to corporate board composition effectiveness to enhance firm information environment through the appointment of directors with financial experience to serve on the board. Second, the study also adds to the literature on the effect of board compositions on stock price behaviour. The results of prior studies on the relationship between board composition and firm performance are inconsistent and the effectiveness of any board composition (e.g. board size, board independence, duality and ownership) is vague (Byrd and Hickman 1992; Wen et al. 2002; Dahya and McConnell 2005; Lien et al.

2005; Abor 2007; Harford et al. 2008; Agrawal and Nasser 2012). The study, therefore, contributes to this field of literature by providing valuable insight into the effect of directors' financial expertise on stock price behaviour. To the best of the researcher's knowledge, this study is the first to address the linkage between board financial experience and stock price synchronicity. Third, the study challenges the SOX Act definition of financial experience, which includes "supervising" employees with financial reporting responsibilities. Directors with CEO- and Chairman-experiences failed to have the same positive influence of those with prior financial reporting responsibilities. Finally, the results obtained in this study offer empirical justification to increasing calls by academics and regulators for more financial-expert directors to serve on boards to avert accounting manipulations and frauds.

1.3.2. Financial experience and cash holding

Chapter 4 of this thesis empirically tests the relationship between directors' financial experience and firm cash holding. Using a sample of 965 US publicly traded non-financial and non-utilities firms between 2000 and 2017, the study report an inverse effect between financial experience on board and firm cash holding. Specifically, the relationship was only found when the financial experience is measured by the directors' accounting financial experience. Results show the effects disappear when directors' financial experience is measured by directors' non-accounting financial experience. The study further tests the linearity of the relationship between accounting financial-experts and firm cash holding by taking the quartile of the high and low fraction of accounting financial-experts and test them against firm level of cash holding. This effort revealed that the relationship was driven from the high fraction of accounting financial-experts reducing the firm level of cash reserves but not from low fraction of accounting financial-experts on board increasing firm cash holding.

The study also explores the cross-sectional heterogeneity in the study's main results in question across firms with different financial constraints and governance characteristics. The cross-sectional test found that the effect of director financial-experts on limiting firm cash holding appears in financially constrained firms (small firm size and low payout ratio). However, using the KZ Index, the effect of financial-experts on firm cash holding appears in financially unconstrained firms (i.e., those with low KZ Index). With regard to firm corporate governance, the effect of

accounting financial-experts is more pronounced in firms with better board structure in terms of independence and board size. However, for CEO duality and E-Index measure, the result of the fraction of accounting financial-experts on board are found in firms with CEO duality and high E-Index measure (high governance needs).

To gain understanding on how financial-experts' interaction affects firm investment decision and performance, the study also investigates the effect of board financial experience on firm investment decision and performance regarding the amount of cash holding. The study found insufficient evidence that the fraction financial-experts' excess cash holding affects firm investment decisions (capital expenditure, R&D or acquisition). However, the fraction of accounting financial-experts explains, positively, a great deal of the change in firm dividend payments from firm excess cash holdings. Moreover, testing the effect of firm excess cash holding on firm market-to-book ratio shows accounting financial-experts' ability to enhance firm profitability and market-to-book ratio from the firm change in excess cash holding.

To allow greater understanding of the effect of financial-experts on firm cash holding, the study examines the relationship of firm financial-experts on the value of cash holding. The study follows Faulkender and Wang (2006) and Dittmar and Mahrt-Smith (2007) models on measuring the firm value of cash holding and found that there is insufficient evidence that financial-experts on board have any effect on firm value of cash holding. Results show no significant effect between the fraction of accounting financial-experts on board and firm value of cash holding and very weak evidence that non-accounting financial-experts matter. This finding implies that investors would not value cash holding any differently in the presence of financial-experts on board.

As a result of this research effort, this study makes several contributions to previous literature on the effectiveness of board financial expertise. First, it adds to the literature on the board of directors' attributes and how firm cash holding is affected. The literature on the effect of board composition and firm cash holding mainly focuses on board independence, board size, CEO duality and board gender diversity (Chen 2008; Gill and Shah 2012; Boubaker et al. 2015; Atif et al. 2019). This study widens the range of board composition by adding the directors' financial experience as a determinant on the level of firm cash holding. Moreover, this study adds to the literature on board of directors' effect on firm profitability. Previous

studies show the effectiveness of board of directors' influence on firm performance is mainly focused on board independence, board size, CEO duality and board gender diversity (Rechner and Dalton 1991; Erhardt et al. 2003; Krivogorsky 2006; Yan Lam and Kam Lee 2008; Belkhir 2009; Yang and Zhao 2014; Kakabadse et al. 2015). This study adds financial-experts on board ability to enhance firm profitability and market-to-book ratio from the firm excess cash holding. Second, this study challenges the SOX Act definition of financial expertise on board by adding "supervising" employees with financial reporting responsibility, as results show that directors with non-accounting financial experience fail to obtain the same effectiveness of directors with prior accounting financial experience.

1.3.3. Financial experience and payout policy

The third empirical chapter (Chapter 5) is intended to investigate the impact of directors with financial experience on firm payout policy. This chapter shows that in the case of enhanced corporate governance through the appointment of financial-experts on board, using three different payout measures, financial-experts were found to have a positive effect on motivating managers to payout more to shareholders. However, this result is only found when the financial experience is measured by directors' accounting financial experience. The results show that non-accounting financial-experts have no significant effect. To verify the study's main results, several robustness checks were conducted controlling for other board of directors' composition (which also affect board monitoring and payout policy) and excluding utility firms, as they are subject to different financial policies and governance regulations that might affect their payout policy. The study's main findings are robust to controlling for board composition and excluding utility firms.

Moreover, to gain a thorough understanding of the effect of financial-experts on board on firm payout policy, the study tests the heterogeneity of the main results regarding the strength of firm's corporate governance and financial constraint level. The results show that the effect of accounting financial-experts on increasing firm payouts are more prominent in firms with weak corporate governance mechanism (firm with high E-Index, CEO duality and large board size). However, the results are mixed, based on firm board independence, depending on different payout measures. Moreover, in highly financially constrained firms, accounting financial-experts on

board play a major role in increasing firms payout level. This is in line with the study's main argument that directors' financial experience enhances board monitoring; reducing agency conflict of interest by increasing firm payouts when corporate governance is weak and financial constraint is high -- more specifically, when managers' incentive is to retain more cash high. Finally, the study further investigates the effect of financial-experts in the form of firm's payout (i.e., dividends and repurchase). The fraction of accounting financial-experts on board would not only increase firm payout level, but would be more likely to pay shareholders in the form of repurchase. This emphasises the role of financial-experts' in enhancing board monitoring through the influence of distributing free cash flow through non-pre-committed shareholders' payments (repurchase).

Overall, this study makes several contributions to financial literature on the role of financial-experts on board effectiveness. These contributions can be summarised as follows: first, the study adds to the literature on the board of directors' composition effectiveness on firm payout policy. Previous literature on the determinants of payout policy mainly focuses on board independence, board size, CEO duality and board gender diversity (Schellenger et al. 1989; Al-Najjar and Hussainey 2009; Byoun et al. 2016; Chen et al. 2017); this study elucidates the board effectiveness, measured by the effect of board financial experience on firm payout level and different policies (dividend and repurchase). Particularly, partially justifying the recent increase of firm share repurchase trend (on the expense of dividend payouts) through the appointment of financial-experts on board. Second, this study challenges the SOX Act definition of financial expertise on board by adding "supervising" employees with financial reporting responsibility, as results show that directors with previous CEO- and Chairman-experiences fail to obtain the same effectiveness of payout policy decisions when compared to directors with prior accounting financial experience .

Chapter 2: Literature Review

2.1. Introduction

This chapter outlines the relevant literature relating to the role of board of directors, stock price synchronicity, cash holding and payout policy. In the event of corporate scandal or financial crisis, blame lies first with the corporate governance system. Given the nature of modern corporation based on a separation of ownership and management, firms establish corporate governance mechanisms to ensure shareholder objectives are met. In addition, it is the board of directors' who hold the highest authority in a firm's governance system. Thus, in the finance literature, the board of directors' role captures the attention of many researchers. Many theories have, indeed, attempted to explain the main role of the board of directors, including the agency theory, resource dependency theory and stewardship theory.

As widely accepted, it was the study undertaken by Jensen and Meckling (1976) which was the first to develop the agency theory. They outlined the existence of the conflict of interest between shareholders and managers and provided argument that a firm's agency problem arises from the conflict of interest and the information asymmetry between managers and shareholders. They highlighted that the only way to mitigate the agency problem is by monitoring managers. Agency theory labels the role of the board, including linking managers' interests to those of shareholders (Shleifer and Vishny 1997; Klein 1998) and validate managers' behaviour by acting as an "information system" used by shareholders (Eisenhardt, 1989).

Unlike agency theory, however, resource dependency theory argues that the boards' major role is as provision resources. The role indicates the directors' ability to add resources to the firm (Hillman and Dalziel 2003). According to Pfeffer and Salancik (2003), under the resource dependency theory, there are two primary contributions of the board of directors to provide advice and legitimacy to a firm's image. In contrast, stewardship theory argues on the nonexistence of shareholders' and managers' conflict of interest. According to the theory, directors' main role is developing firm strategy, rather than monitoring managerial performance (Cornforth 2003).

Considering the board of directors' play a crucial role in a firm, prior studies have widely investigated board of directors' composition. In the financial literature, studies have linked board of directors' composition to firm cross-section variations in stock return ((Byrd and Hickman 1992; Fich and Shivdasani 2006; Francoeur et al. 2008), firm informational environment (Cheng and Courtenay 2006; Ferreira et al. 2011; Upadhyay and Sriram 2011; Upadhyay and Zeng 2014) and firm decision making, including cash holding (Chen 2008; Gill and Shah 2012; Boubaker et al. 2015; Atif et al. 2019) and payout policy (Schellenger et al. 1989; Al-Najjar and Hussainey 2009; Byoun et al. 2016; Chen et al. 2017). Following the demand by policy makers to establish financial expertise on board, directors' financial experience has become an interesting topic for academics. Studies on board of directors' effectiveness found that financial-expert directors are linked to market value **(**DeFond et al., 2005), financial decisions (Güner et al., 2008), stock return performance (Fernandes and Fich, 2009) and risk taking (Dionne and Triki 2005; Sun et al. 2014; Fernandes and Fich 2016; García-Sánchez et al. 2017).

In relation to the information environment of firms, previous studies have use stock price synchronicity as a proxy of the level of firm-specific information incorporated into the share price. Roll (1988) argues that the extent to which stock prices move in the same direction related to firm-specific and market-wide information embedded in the share price. Roll (1988) propose that a large proportion of stock price variation cannot be justified by systematic factors[5] and considers that high stock variation might reflect on privet information capitalised into the stock price via informed trading. Roll (1988) concludes that higher levels of firm-specific information in the market results in lowering a firm stock price synchronicity.

Built on Roll (1988) findings, Morck et al. (2000) was the first to implement stock pricy synchronicity as a measure of the amount of firm-specific information imbedded in the share price. Morck et al. (2000) used the market model R^2 value on a country-level and conclude that share prices in countries with low shareholder protection (reflected in the country equity market development, investors right and

[5] Roll, R. 1988. R2. *The Journal of Finance* 43(3), pp. 541-566. U.S. sample show that market model R^2explains only a small portion of stock movement, about only 35%(20%) of a firm's monthly (daily) stock returns.

legal regimes) tent to move in the same direction, indicating a high stock price synchronicity level.

Following Roll (1988) and Morck et al. (2000) findings, several studies linked low stock price synchronicity to other factors, such as: shareholder protection (Fernandes and Ferreira 2008; Kim and Shi 2010) developed financial analysis industry (Bushman et al. 2004) enhanced disclosure (Shi and Kim 2007; Haggard et al. 2008; Song 2015) and better audit quality (Gul et al. 2010). Bearing in mind that the level of firm-specific information embedded in the share price is affected by a wide range of variables, the study argued that financially sophisticated boards could be a major determinant to a firm's information environment in two ways. First, by increasing the monitoring effectiveness over managers which makes managers more transparent. Second, by changing the nature and dynamic of the board, this makes members of board of directors pay more attention to the quality of information reported.

Moving to firm cash holding, decision on the amount of access cash should be held and how the excess of cash should be used are made by top management inconsistent with either firm objectives or personal goals. Managing cash holding has a direct implication on investors (e.g., dividend payments and investments opportunities). Thus, it is in the best interests of shareholders that the firm's governance is appropriate to ensure managers' behaviour towards firm cash holding serves shareholder interests rather than their own. With regard to firm cash holding, three dominant theories aim to explain the determinants of firm cash holding: namely, the pecking order theory, the trade-off theory and the free cash flow theory.

The pecking order theory of finance argues that a firm's internal financing is the least costly and more preferred choice of financing. It limits the firm exposure of firms to capital market transaction costs and the asymmetric information problem (Myers and Majluf 1984). According to this theory, firms' preference on investments financing relies on their retained earnings, than debt or equity (Al-Najjar and Belghitar 2011). The theory assumes the non-existence of optimal level of cash and firm cash holding changes in relation to firm earnings and profitability only (Opler et al. 1999). On the other hand, the trade-off theory proposes the idea of a unique optimal level of capital structure, using a cost-benefit analysis, for firm value-maximisation objective

(Kraus and Litzenberger 1973). Both theories (the trade-off theory and the pecking order theory) assume no agency conflict of interest. Thus, Jensen (1986) and Stulz (1990) develop the free cash hypothesis, claiming that substantial amounts of cash holding lead to entrenched managers raising the agency conflict of interest between shareholders and cash holders. They argue that to mitigate agency problem, shareholders prefer to minimise managers' access to free cash flow, offering sufficient free cash flow for firms to invest in all positive net present value investments and insufficient for management misuses. The theory suggests that strong corporate governance plays a vital role in mitigating managers' misuse of cash (Jensen 1986; Dittmar and Mahrt-Smith 2003). This part of the study uniquely links board of directors' financial expertise role with enhancing managers' behaviour towards firms cash holding.

Payout policy is also another major financial decision taken by the board of directors on which the study incorporates. In the literature, several theories explain firm's dividend payout policies. For example, signaling theory assumes that managers use dividend policy to signal information regarding firm future earnings since managers know more than shareholders about a firm's financial wellbeing (Bhattacharya 1980; Healy and Palepu 1988; Gugler 2003). Under the agency theory perspective, firm dividend payments are used as an essential controlling mechanism to mitigate firm agency cost (Jensen 1986; Fenn and Liang 2001; Byoun et al. 2016). Arguably, to avoid management misuse of excess cash, shareholders prefer dividend payments instead, or firm retained earnings as a result of the separation of control (Rozeff 1982). Using board of directors as a monitoring mechanism, the relationship between the board of directors' composition and payout policy is well established in the literature (Schellenger et al. 1989; Abdelsalam et al. 2008; Adjaoud and Ben-Amar 2010). However, the relationship between financial-experts and firm payout policies is still unclear. This study investigates the relationship between directors on the board financial experience and firm payout policy.

The remainder of this chapter is organised as follows: Section 2.2 discusses the theories underpinning financial experts serving on the board of directors; Section 2.3 discusses the literature review behind the primary role of board of directors; section 2.4 discusses the literature review behind the firm stock price synchronicity;

Section 2.5 discusses the literature review behind the firm cash holding; Section 2.6, 2.7 and 2.8 discusses the literature review behind the firm payout policy; and section 2.9 concludes the chapter.

2.2. Role of the board of directors

A wide range of theories have been developed to explain the primary role of the board of directors. These include agency theory, resource dependency theory and stewardship theory. The following sections discuss the literature review related to these theories.

2.2.1. Agency Theory

The root of the traditional agency theory is based on the separation between the ownership and control of corporations, which illustrates the existence of firms. In 1776, Adam Smith cited managers' ability to waste firms resources; he was the first to suggest that firm assets would suffer at the hands of managers providing the separation of ownership and control. Following the study, Dodd et al. (1933) showed that managers tend to focus on their best interest rather than the shareholders' interest. According to Baysinger and Hoskisson (1990), in June 1959, Simon Herbert state that managers might be "satisfiers" rather than "maximisers". That is, they are not seeking ultimate growth, but rather play it safe and seek a reasonable amount of growth, having more concerned with maintaining their presence in the firm than maximising shareholder wealth. However, shareholders do appoint managers and delegate decision-making to them, assuming they will act in their best interest.

Agency theory was developed by Jensen and Meckling (1976) who looked at the contractual environment between firm stakeholders. In a contractual environment, they outlined the shareholders, debt holders and managers to be conflicting parties. The modern corporation is built based on the separation of ownership and control; thus, owners must appoint experts to undertake corporate matters on their hands. Jensen and Meckling (1976) conceptualised this as "agency relationship". Jensen and Meckling (1976) defined the latter as an agreement where the principal(s) (shareholders) delegate firm decision making authority to the agent (managers) to act on their behalf. Given the modern corporation environment, as suggested by Dodd et al. (1933), managers are highly authorised where shareholders are relatively inactive

party towards corporate affairs. This setting boosts managerial control and their temptation to act in self-interest, scarifying shareholders interest, forming the agency problem (Jensen and Meckling 1976)

The agency theory assumes non-existence in a well-developed market for corporate controls. Consequently, the study experiences the existence of market failures, non-existence of markets, moral hazards, asymmetric information, incomplete contracts and adverse selection, among others (see Bonazzi and Islam (2007). In the literature of financial corporate governance, the most effective mechanism for corporate control i.e.,(to influence managers to act in the best interest of shareholders) is a topic of significant concern (Allen and Gale 2000). Research studies promote different governance mechanisms, including monitoring by financial institutes, healthy market competition, executive compensation, debt, implementing an effective board of directors, markets for corporate control, and concentrated holdings (see Bonazzi and Islam (2007) However, increasing the board effectiveness continues to be a vital and practical option to improve corporate governance mechanisms.

2.2.1.1. Agency theory and the role of board of directors

In the attempt of mitigating agency issues, the corporate board of directors provides the primary corporate governance internal control mechanism to monitor managers. From the agency theory perspective, the board of directors is an "information system" used by principles to validate agents' behaviour (Eisenhardt 1989). Agency theory labels the role of the board, including linking managers' interests to those of shareholders (Shleifer and Vishny 1997; Klein 1998). According to Garratt (1997) definition, the board of directors' primary functions are: the mutual responsibilities of governing the company's drives and "ethics"; forming firm strategies and plans; monitoring and control the CEO; and inform and make recommendations to shareholders. According to Muth and Donaldson (1998), in principle, the board are shareholders' representatives in the firm. Studies like Adams and Ferreira (2007) and Raheja (2005) propose that boards take the two roles of monitoring and advising managers. Fama and Jensen (1983) propose that to meet firm efficiency, the board should act on employing competent managers, relinquish poor performers and set managerial incentives based on meeting firm strategy.

2.2.1.2. Agency theory and board composition

The monitoring and advisory role of board of directors is to ensure firm decisions are taken based on shareholders' interest. Fama (1980) proposed that the board composition is an important mechanism that ensures board maintain its role in providing guidance and direction. He argues that the existence of non-executive directors is an indicator of monitoring executive directors' decision and ensuring executive directors pursue policy dependent on shareholders' interest. Bonazzi and Islam (2007) argue that directors should approach discriminating questions with the independence of thoughts until they receive answers that they and other board members comprehend. Studies as to what determines better corporate governance show that the board of directors' composition directly affects firm performance. However, there is no clear answer as to the type of directors ideal for serving shareholders' interest and studies conclude mixed results. Previous research on directors' type focuses on directors' independence and board diversity (including gender, experience and background). Looking at directors' independence, Weisbach (1988) documents a relationship between independent directors dominating boards and CEO turnover based on performance. Klein (2002) found that more independent board is associated with higher efficiency in CEO performing their monitoring role in the financial accounting process. Similarly, Jaggi et al. (2009) show that board independence ensures high-quality financial reporting. Bhagat and Bolton (2008) also show that board independence is associated with the probability of disciplinary management turnover. These studies suggest that board independence is associated with better board monitoring and thus improving firm decision-making and performance.

In contrast, other studies challenged the conventional wisdom of board independence and improving monitoring. Agrawal and Knoeber (1996) documented a negative relationship between the percentage of outside directors and firm performances for 800 firms in 1987. Bhagat and Black (2002) studied the first large-sample, a long-horizon study of large American firms that found no relationship between board independence and measures of long-term performance. They, instead, explained that law-performance firm increases the independence of the board. Dalton et al. (1998), Hermalin and Weisbach (2003), De Andres et al. (2005) and Jackling

and Johl (2009) also found the percentage of outside directors to have no effect on firm performance or market value.

Focusing on directors' diversity, Beasley (1996) proposed that directors' experience or occupation could affect directors' ability to monitor CEO effectively. Similarly, Hillman and Dalziel (2003) argued that board capital (i.e. experience, expertise and reputation) affects board monitoring and provisioning of resources. Wang et al. (2015) found that industrial experience enhances independent directors' ability to implement their monitoring role. Moreover, Gray and Nowland (2015) found that directors' specialist business experience (i.e. lawyer, accountants, consultants bankers and independent CEOs) is associated with higher shareholders' value. When studying market reaction to employing new financial experienced directors on board, DeFond et al. (2005) found a positive market reaction following appointment of financial-experts on the audit committee. Their results suggest that directors' experience plays a significant role in improving corporate governance. On the other hand, Grace et al. (1995) studied Australian listed firms and found that despite most non-executive directors hold degrees, it appears unrelated to different financial performances.

Agency theory is relevant to this study in several ways. First, given the separation of ownership and control between shareholders and managers, improving board of directors' monitoring and advisory role through the appointment of financial-experts on board might well affect board outcome in terms of reducing firm information asymmetry. This directly affects the firm information environment and, therefore, firm stock price synchronicity. Moreover, linking managers' interest to the shareholder would also affect managerial financial-decisions related to firm cash holding and payout policy.

2.2.2. Resource Dependency Theory

Unlike the agency theory, the resource dependency theory is less well explored in prior literature. In addition to the board monitoring role, according to the theory, the board plays a significant role in providing resources (Hillman and Dalziel 2003). This perception was the central concept behind studies on the resource dependency (Pfeffer 1972; Boyd 1990; Daily and Dalton 1994; Gales and Kesner 1994; Hillman et al. 2000;

Hillman and Dalziel 2003; Pfeffer and Salancik 2003). Board provision resources role indicates the board ability to add resources to the firm (Hillman and Dalziel 2003). The theory concept was developed by Pfeffer and Salancik (1978) work, which suggests that firms assign individuals to the board assuming they will always support the organisation, be concerned with its difficulties and always try to assist.

According to the Oxford Dictionary, *experience* is "The knowledge or skill acquired by a period of practical experience of something, especially that gained in a particular profession". Pfeffer and Salancik (1978) outline two primary contributions from the board of directors to the firm: counsel/advice and legitimacy of firm image. Hillman and Dalziel (2003) then added the role of being the means for communicating information between firms and external environment and the channel to access commitments or support from critical resources outside the firm. Thus, experience may allow directors to contribute to firm provision resources through sophisticated counsel/advice and more accurate information representing the firm image. The theory is directly related to the research as it questions the effect of directors' financial experience on the firm information environment and decision making.

2.2.3. Stewardship theory

Stewardship theory is a theory that holds contrary perspective to the agency theory. Stewardship theory addresses the agent-principle relationship; however, it assumes that the relationship between managers (agent) and directors (principal) based on trust and collaboration (Donaldson 1990; Donaldson and Davis 1991, 1994). Davis et al. (1997) defined the Stewardship theory as "Maximising shareholder wealth through firm performance because by so doing, the steward's utility functions are maximised". From this concept, stewards, being firm executives' directors and managers, work to protect and maximise shareholders' wealth. The theory suggests that they can act on the sincerity of interest on their own. It argues that executives' directors and managers integrate their goals as part of the organisation, and their satisfaction and incentive are based on organisation success (Donaldson and Davis 1991) Moreover, Daily et al. (2003) argue that managers and directors are inclined to protect their reputation as corporate decision-makers. Thus, they are motivated to work based on protecting shareholders interest. According to the theory, rather than monitoring managers' performance, directors' primary role is developing a firm strategy (Cornforth 2003).

In contrast to the agency theory, that drew the attention on directors' monitoring role onto managers, stewardship theory embraces the non-existence of conflict of interest. Thus, the implications of stewardship theory to the current research are as following: if stewardship theory applies, corporate performance should not be affected by the difference in directors' characteristics. Thus, experience of all types of directors should be equally affecting firm performance. However, not differentiating between directors could deviate results from the real effect on performance.

2.3. Financial-experts serving on the board of directors

Following recent demand from policymakers for more financial-experts on audit committee (e.g. SOX Act), the role of financial-experts on board attracts the attention of academics. This section discusses the main studies focusing on the principal role and the effects of financial-experts in firm monitoring and advisory role and the main determinants of directors' financial experience in the literature. Moreover, this section outlines the way this thesis measured directors' financial experience as this measure is applied in all three topics under investigation in this research effort.

2.3.1. The role of financial-experts on board of directors

Board composition is one of the primary topics when assessing a firm's corporate governance. Following a recent increase in firm appointments of financial-expert directors, recent studies, have indeed, investigated the role of directors' financial experience effectiveness. DeFond et al. (2005) studied the effect of the appointment of financial-experts on the audit committee in firm market value. Using accumulative abnormal return, they found a positive market reaction following the appointment of accounting financial-experts serving on board of directors. However, they report no significant reaction following non-accounting financial-experts and maintain that this is in line with the argument that accounting-based financial skills enhance the quality of firm financial reporting. Güner et al. (2008), on the other hand, empirically tested the extent to which financial-experts on the board effect corporate decisions on US public traded firms and found that not all financial-experts are beneficial to the board of directors. Specifically, many affiliated directors (commercial and investment bankers) do not act in shareholders' best interest, rather, they act on their banks'

interest. Other studies also link directors' financial experience to risk-taking (Dionne and Triki 2005; Sun et al. 2014; Fernandes and Fich 2016; García-Sánchez et al. 2017)

On the main determinants of the board financial experts, Jeanjean and Stolowy (2009) studied evidence of non-financial listed firms in France. On average, financial experience is found on firms with high board independence, high ownership concentration and high institutional ownership. According to Jeanjean and Stolowy (2009), these are in line with stronger boards characteristics. When studying firms' board financial-experts' advisory role free of potential conflict of interest, Huang et al. (2014) establish that financial-experts are able to identify better mergers and acquisition opportunities and reducing costs of the deals.

Regarding the interest in financial expertise in recent literature, studies on the dynamics of relationship between financial expertise on board and board effectiveness show mixed results. Following the recent rise in financial expertise on board of directors, it is essential to investigate how financial-experts serving on board of directors affect firm stock price synchronicity (a measurement of firm information environment well-being) and top management's main financial decisions regarding cash holding and payout policy.

2.3.2. Determinants of directors' financial expertise

According to the Oxford Online Dictionary definition, "experiences" is defined as "The knowledge or skill acquired by a period of practical experience of something, especially that gained in a particular profession". Thus, the experience is weighted by the criteria conferring an individual's ability to carry out a professional task. In the US, some guidance on how to determine financial expertise criteria on the board of directors was presented in the Blue-Ribbon Committee report and the Sarbanes-Oxley Act. Not only in the US, but the Smith Committee Report also guides other countries, such as the UK and France, by the Vienot I and Vienot II and the Bouton Report.

In France, because financial expertise on board is voluntary, the corporate governance "best practice", the Vienot I report (1995) and Vienot II report (1999) did not refer to the board of directors' financial experience of the board of directors. However, in the Bouton report (2002 p.12) financial experience was specifically mentioned once:

> The member of the audit committee, in addition to their existing financial management and/or accounting experience, should upon appointment be informed about company-specific accounting, financial and operation features.

Nevertheless, the report did not specify the way to identify financial experience.

In the US, the Blue-Ribbon Committee (1999 p.25) the perception of accounting and/or related financial experience – where "experience" signifies as:

> past employment experience in finance or accounting, requesting professional certification in accounting or any other comparable experience or background with results in the individual's financial sophisticated including being or having been a CEO or other senior officer with financial oversight responsibility.

Moreover, in the Sarbanes-Oxley Act (US Congress, 2002), the Securities and Exchange Commission (SEC) first describes the financial-expert directors as directors with prior experience in the SEC financial reporting, suggesting that directors with SEC financial reporting experience will be experts in public accounting, auditor, principal financial officer, principal accounting officer or controller (DeFond et al. 2005). Facing criticism claiming that SEC definition of financial experience limits the pool of qualified directors, the SEC then added experience in "supervising" employees with financial reporting responsibilities, "overseeing" the performance of the companies and other relevant experience as a determinant of accounting experience. Although the SEC does not specify any job titles that under this broader definition are qualified, the definition is extended to include directors with prior experience as Company Presidents Chief and Chief Executive Officers (CEOs) (DeFond et al. 2005; Jeanjean and Stolowy 2009).

Interestingly, previous studies measured financial expertise differently. Table 2.1 provides an overview of how the financial experience was measured in the literature. The following section emphasises how this study measured directors' financial expertise.

2.3.3. Measuring directors' financial experience

Following previous discussion on how to determine financial experience, this study measures financial experience in two ways:

(1) **Accounting financial experience:** following Güner et al. (2008); Minton et al. (2014); Fernandes and Fich (2016), the study defines directors with financial expertise as those who have worked as a: (1) banking institution executive; (2) financial institution (non-bank) executive; (3) finance related position of non-financial firms (CFO, Accountant, Treasurer, Vice President for Finance. etc.); and (4) as a professional investor.

(2) **Non-accounting financial experience**: following the SOX Act later added financial definition, the second measure includes all directors with (5) experience as either a CEO or President of profit corporations experience.

Table 2. 1 Measuring financial experience in the literature

Author	Topic	Sample size	Way of measuring financial experience	Database
	This research	non-financial firms from the S&P 1500 database from: 1999-2017	(1) **accounting financial experience:** following Güner et al. (2008); Minton et al. (2014); Fernandes and Fich (2016), the study defines directors with financial expertise as those who have worked as a: (a) banking institution executive; (b) financial institution (non-bank) executive; (c) finance related position of non-financial firms (CFO, Accountant, Treasurer, Vice President for Finance. etc.); and (d) as a professional investor. (2) **non-accounting financial experience**: following the SEC later added financial definition, the second measure includes all directors with (e) experience as either a CEO/President of profit corporations experience.	BoardEx.
(Fernandes and Fich 2016)	Are outside directors with greater board tenure valuable? Evidence from the last credit crisis	479 publicly traded US banks from: 2002-2008	Use three different proxies following; (1) DeFond et al. (2005), (2) Hau and Thum (2009) and (3) Güner et al. (2008)[6]	BoardEx and director bio-sketch data disclosed by each bank to the SEC in form 14-DEF. Also, corporate annual report, alumni website, and publication issued by various charitable foundation.

[6] The three methods are further explained down in this table.

(Minton et al. 2014)	Financial Expertise of the Board, Risk Taking, and Performance: Evidence from Bank Holding Companies	all US banks along with specialty and other finance firms. (around 150 firm) from: 2003-2008	Classify an independent director as a financial expert if he or she (1) has worked within a banking institution, or (2) currently works at a non-bank financial institution, or (3) has a finance-related role within a non-financial firm (e.g. CFO, accountant, treasurer, or VP finance), or (4) academic institution (e.g. professor in finance, accounting, economics or business), or (5) is a professional investor (e.g. hedge fund, private equity).	BoardEx.
(Jeanjean and Stolowy 2009)	Determinants of board financial expertise – Empirical Evidence from France	Sample of 95 non-financial **French listed firms**.	-Educational Background: (1) Qualification in management education (University or Business school degrees, MBAs, CPA qualification etc.). -Career History: (1) Chief Financial Officer, or (2) Chief Accounting Officer, or (3) Management controller, or (4) External auditor, or (5) member of financial state agency, or (6) Banker, or (7) Business lawyer, or (8) Other financial functions (investment advisor, accounting or financial academic, political function in the field of accounting, etc.). Financial experience was measured by coding the experience as following; 1 for financial educating, 2 for financial experience and 3 for financial education and financial experience.	Annual reports Who's who Factive Internet Diane
(Fernandes and Fich 2009)	Does Financial Experience Help Banks During Credit Crises?"	398 **US banks** from: **2006-2007**	Financial expertise of the board as the average number of years of banking experience among board directors. As a robustness test the financial experience was measured by the average number of years of serving the financial industry among board directors.	BoardEx.
(Hau and Thum 2009)	Subprime Crisis and Board (In-) Competence: Private vs. Public Banks in Germany.	29 **largest German banks** from: **2007-2008**	Financial experience was defined by; (1) Banking Experience, or (2) Financial market experience. previous occupation related to asset market trading or investment.	publicly available sources (the annual statements and the web sites of the banks)

(Güner et al. 2008)	Financial Expertise of Directors	**largest US publicly companies** traded companies exclude financial firms. (282 firms). from: **1988-2001**	Outside directors were categorised by their previous experience as; (1) commercial bank executive. (2) investment bank executive. (3) executive of a nonbank financial institution. (4) finance executive (CFO, Accountant, Treasurer, or Vice President for Finance). (5) "finance" professor (i.e., finance, economics, accounting, and business). (6) consultant. (7) lawyer. (8) executive of a non-financial firm that falls outside these groups. (9) non-corporate worker (including careers in academia, non-profit or civil activist organizations, and politics).	hand-collect biographical information on all board members of these companies using annual proxy statements (1988−1997) and the IRRC database (1998−2001).
(DeFond et al. 2005)	Does the Market Value Financial Expertise on Audit Committees of Boards of Directors?	592 **US corporations** firm From: **1993-2002**	Following the final version of SOX Financial Expert definition– All directors who are financial-experts are categorised into one of the following two categories: a) **Accounting Financial Expert** – Inferred from the suggestions included in the early version of SOX proposed by the SEC – All directors with experience as a public accountant, auditor, principal or chief financial officer, controller, or principal or chief accounting officer. b) **Non-Accounting Financial Expert** – Based upon the final version of SOX drafted by the SEC – All directors with experience as the chief executive officer or president of a for-profit corporation.	Corporate Library database

2.4. Board of directors and stock price synchronicity

In an efficient market, share prices incorporate and reflect all information related to a firm. It assumes that all market participants share the same information and the cost of production and gathering this information in the market is relatively low. However, as Grossman and Stiglitz (1980) argue, firm-specific information is costly and investors will only expand resources spent on acquiring information if they believe that the benefit will outweigh the cost. Roll (1988) argues that the extent to which stock prices move in the same direction is related to the fraction of firm-specific information to market and industry-wide information embedded in the price.

Under the price synchronicity topic, Roll (1988) was the first to look into the value from asset pricing regressions investigated across corporations. He considered the reasons underpinning low price synchronicity and whether it is caused by private information or as a result of other pricing errors. He concluded that higher levels of firm-specific information in the market result in lower stock price synchronicity.

Following the Roll (1988) findings, studies widely researched the topic of stock price synchronicity in the financial and economic literature, on a country- and firm-wide level. For instance, at the country level, Morck et al. (2000) found that stock price synchronicity is higher in emerging markets than in developed markets. They note that the main reason behind high market synchronicity in emerging markets is due to lack of shareholder protection. Morck et al. (2000) findings were later confirmed by studies by Fernandes and Ferreira (2008) and Kim and Shi (2010). Moreover, Beny (2005) added that countries adopting laws which prohibit insider trading have more asynchronous share returns, stating that shares are more informative when strict insider trading laws are adopted. Also, according to Bushman et al. (2004), more significant firm-specific return variations were spotted in countries with more open media and developed financial analysis industries compared to countries with a constrained media and a less developed financial analysis industry. Shi and Kim (2007), find that enhancing disclosure through the adoption of IFRS would encourage informed traders to trade based on private information, which would increase the price informativeness and thus reduce stock price synchronicity. Other studies also show

that low stock price synchronicity is related to better capital market governance (Daouk et al. 2006) and better country transparency (Jin and Myers 2006).

Examining stock price synchronicity at a firm level, Piotroski and Roulstone (2004) study on the US market investigates the effect of the three most informed market participants on the amount of firm-specific, market-level and industry-level information available in the market. Their results indicate a positive relationship between investors' activities and stock price synchronicity as a result of increasing industry-wide information in the market. They also find that insider trading and the presence of institutional investors increase the share price informativeness, decreasing the firm's stock price synchronicity. Other studies also link stock price synchronicity to ownership concentration, foreign shareholders (Gul et al. 2010), large controlling shareholders (Boubaker et al. 2014) and corporate investment efficiency (Durnev et al. 2004).

Song (2015) investigates the relationship between accounting disclosure policies and the level of firm stock price synchronicity. She finds a negative relationship between superior accounting disclosure policies and shares price synchronicity. Haggard et al. (2008) studied the effect of voluntary disclosure on the level of stock price informativeness. They found that increasing firms' voluntary disclosure enhances the amount of firm-specific information embedded in the price. However, Dasgupta et al. (2010) argue that when firm transparency improves information flow about a future event, future synchronicity will rise, as when the "future event" actually occurs, shareholders are not expecting any surprises, concluding that more transparency today results in high synchronicity in the future. Gul et al. (2010) found that improving audit quality has a positive effect on reducing firm stock price synchronicity.

Recent studies document the role of the board of directors' composition, improving firm informational environment. Vafeas (2000) examined the firm earning informativeness and found that earnings of firms with small boards (with a minimum of five directors) are seen as being more informed by market participants, consistent with Ahmed et al. (2006) study which focused on the level of public released-information and found that firm board size is inversely related to firm earnings information. Other studies, such as Firth et al. (2007), found the board of directors'

independence effect earning informativeness in respect of the earnings' response coefficients and discretionary accruals in China-listed companies, contrary to Ferreira et al. (2011) study which found a negative relationship between board independence and price informativeness. Moreover, Ahmed et al. (2006) and Vafeas (2000) found that board independence does not affect firm earnings' informativeness. Their results are consistent with the argument that board monitoring and information environment are a substitute.

Studies on board of directors' composition effect on firm information-environment show mixed results and the dynamics of relationship are vague. Previous studies on board financial-experience show financial-experts' ability to improve firm disclosed information. Felo and Solieri (2009) study directors on audit committee financial experience and found that independent financial-experts improve the quality of firm financial disclosure. On the other hand, Carcello et al. (2006a) focused on firm earning management and found that independent financial-experts on the audit committee are the most effective in mitigating earning management. Huang and Thiruvadi (2010) study financial-experts' effect on corporate fraud and found that financial-experts on audit committee are significantly associated with fraud prevention. Their results suggest the financial-experts play a significant role in firm corporate governance practices and financial reporting.

Following previous literature on the role of financial-experts in improving firm information environment, mainly focusing on financial-experts on the audit committee, and as the appointment of financial-experts on board has increased in recent years, there is a gap in the literature on the effect of financial-expert directors. This study looks empirically into the directors' financial experience effect on firm stock price informativeness, measured by firm stock price synchronicity.

2.5. Board of directors and cash holding

Several theoretical perspectives aim to explain corporate cash holding, namely the pecking order theory, the trade-off theory and the free cash flow theory. Emerging from Myers and Majluf (1984) study, pecking order theory (or financial hierarchy theory) of financing argues that firm internal financing is the least costly and more preferred choice of financing. The availability of internal funds limits firm exposure

to the capital market, which is largely implicated in transaction costs and asymmetric information problem. According to the theory, firms follow a strict pattern which relies on financing investments through retained earnings, rather than debt or equity (Al-Najjar and Belghitar 2011). As firms' cash holding changes with firm performance, the theory assumes the non-existence of optimal level of cash (Opler et al. 1999). Dittmar and Mahrt-Smith (2003) studied cross-countries corporate governance (more than 45 countries) and found that countries with low shareholder protection hold a substantial amount of cash in comparison to firms located in countries with reliable shareholder protection.

Contrary to the prediction of pecking order theory, the trade-off theory proposes the idea of a unique optimal level of capital structure, using a cost-benefit analysis, for firm value-maximisation objective (Kraus and Litzenberger 1973).The marginal benefit arising from holding cash is because cash holding firms can limit the firm financial cost rising from relying on external funding or liquidating firm assets. Moreover, cash holding prevents firms from going into financial distress, leading to bankruptcy. In contrast, the marginal cost of holding cash arises from the opportunity cost due to precautionary reasons for cash holding (Opler et al. 1999).

The trade-off theory and the pecking order theory assume no agency conflict of interest between shareholders and managers. As a result, Jensen (1986) and Stulz (1990) developed the free cash hypothesis, claiming that substantial amount of cash holding leads to enchanted managers raising the agency conflict of interest between shareholders and cash holders. With excess cash in hands, managers avoid external financing to escape capital market monitoring and thus, investment decisions might not be in line with shareholders' interest. To mitigate the agency problem between shareholders and managers, shareholders prefer to minimise managers' access to free cash flow. The main trade-off in these two studies is offering enough free cash flow for firms to invest in all positive net present values investments and not enough for management misuses. Internal control mechanism drives self-interested managers to deploy cash reserves in the interest of shareholders. The theory suggests that strong corporate governance encourages the distribution of free cash to shareholders to limit the amount of free cash flow available to managers (Jensen 1986; Dittmar and Mahrt-Smith 2003).

Following leading studies on the optimal level of firm cash holding by Kim et al. (1998) and Opler et al. (1999), many other studies have been conducted on the main determinants of firm cash holding policy. Decisions on the amount of access cash should be held and uses of the excess of cash are made by firm top-management, consistent with either the firm objectives or private aims. Managing cash holding has a direct implication for investors (such as dividend payments and investments opportunities). Thus, it is in the best interest of shareholders that the firm's governance is put in place to ensure managers' behaviour towards firm cash holding serves shareholders' interest rather than managers' intentions. According to agency theory, the firm's corporate governance plays a significant role in firm cash management. When investigating the determinant of cash holding in the Europe, Ferreira and Vilela (2004) found that firms located in countries with a highly developed capital market, and high shareholder protection, retained less cash. Moreover, Harford et al. (2008) focussed on the effect of corporate governance on cash holding in the US and found that cash-rich firms with weak corporate governance choose to spend cash quickly on non-profitable acquisition and capital expenditure. Dittmar and Mahrt-Smith (2007) emphasised on the importance of enhancing corporate governance structures to control managers' misuse of cash holding; thus, enhancing the contribution of excess cash to firm value.

The role of the board of directors is one of the increasingly vital issues in effecting managerial incentives (see Hermalin and Weisbach (2003) for a comprehensive survey). A widely known interpretation in the literature is that composition of the board of directors affects the level of association between managers and shareholders' interest. Board of directors' composition plays a significant role in decisions related to corporate cash policy. For example, Boubaker et al. (2015) show the direct effect of board independence and CEO duality on firm cash holding. Other studies document a relationship between board composition (e.g. board size, independence, gender diversity and CEO duality) and firm cash holding and emphasise the role of more effective board structure as a disciplinary mechanism on firm cash management (Kusnadi 2003; Drobetz and Grüninger 2007; Chen 2008; Isshaq et al. 2009; Gill and Shah 2012; Al-Najjar and Clark 2017; Atif et al. 2019; Hassanein and Kokel 2019). Considering the extensive research into board

demography on firm cash holding, to the researcher's knowledge there are no studies yet into the effect of board financial experience on firm cash holding.

Previous studies show financial-expert' directors' ability to improve board monitoring role (Xie et al. 2003; Abbott et al. 2004; Agrawal and Chadha 2005). Improving monitoring reduces the information asymmetry problem between shareholder and managers. Arguably, this would ease borrowing constraints, increasing the firm ability to raise money externally (Ozkan and Ozkan 2004), which suggests a negative relationship between board financial experience and firm cash holding. Moreover, according to the agency theory, improved board monitoring role over managers gives shareholders more power over managers, mitigating managers' incentive to retain more cash. On the other hand, improving board efficiency can provide shareholders with better protection. According to Opler et al. (1999), consistent with the financial hierarchy hypothesis, with strong shareholder protection, shareholders would be more willing to ease restrictions on managers allowing them to retain more cash. This suggests that, as financial-expert directors improve board efficiency, financial-expert directors have a positive effect on firm cash holding. Regarding the conflicting view on corporate governance effect on firm cash holding, this study sheds light on the effect of financial-expert directors' effectiveness on the level of firm cash holding.

2.6. Payout policy

Since Miller and Modigliani (1961) established their famous "irrelevance of dividend" theory, arguing that firm dividend policy is irrelevant to its stock price, dividend policy has become an intriguing topic among researchers. However, Miller and Modigliani's theory is based on the assumption of; (1) perfect capital market, (2) investors' rational behaviour, (3) no existence of tax or transaction cost and (4) perfect certainty of the firm future investment policy and market price. Miller and Modigliani argue that share price is mainly determined by the firm earnings and investment decisions, rather than their dividend payments and policies. Under the assumption of perfect capital market, firms with fixed investment policy, the firm dividend policy will only disturb the amount of capital needed to be raised for new investments. According to Miller and Modigliani's conclusion, firm investment policy is the main determinant of a firm share price and profitability. From the investors' perspective, they argue that firm

dividend policy is irrelevant. Investors can generate self-made dividend from the change in firm share prices by selling shares.

Since Miller and Modigliani's theory, researchers have attempted to relax their assumptions by proving several market imperfections. In reality, a substantial market imperfection is that firms and investors are required to pay income tax and transaction cost. Thus, firm cost of equity is affected by their dividend policy due to taxation and transaction cost. Moreover, the perfect market condition requires symmetric information and aligned interest between investors and managers, which rarely exist in the capital market. Thus, Miller and Modigliani's conclusion cannot hold in the real world (Lease et al. 1999).

Interestingly, many theories followed Miller and Modigliani's theory in attempt to explain the determinants of the firm dividend policy. More relevant to the study are the signalling theory and agency theory. The following section summarises these theories.

2.7. Payout policy explanations

The principal determination of firm payout policy has constituted a leading interest in corporate and finance literature. Studies were based on two primary theories: the signalling theory and the agency theory. The following sections overview these theories highlighted in prior literature.

2.7.1.1. Payout policy and signalling theory

Signalling theory considers issues related to information asymmetry between firm outsiders and insiders. Managers are considered to have more information about future perception. Thus, any dissension made by the firm managers is a sign to investors on private information. Accordingly, investors regard any change in the firm dividend policy as a sign on the firm's financial wellbeing (Frankfurter and Wood Jr 2002). It is frequently debated that share price of a firm drops following the announcement of dividend payout cut. The announcement of dividend decrease causes negative security returns, where the announcement of dividend increase causes positive security returns.

Meanwhile, researchers such as Bhattacharya (1979), John and Williams (1985) and Miller and Rock (1985) developed the dividend signalling theory classic-models. Bhattacharya (1979) conducted one of the first studies to introduce a dividend signalling model under the assumption that a firm's managers hold more information about the firm's profitability than outside investors and that managers' can transfer private information to the capital market through abnormal cash dividend announcement. According to Bhattacharya (1979), in the case of firms making a profit on their projects, the dividend can be realised based on their realised earnings. However, when firms have a loss on their projects, a dividend can only be paid through external finance bearing the transaction costs. Thus, the only justification for firms to pay high dividend is when managers predict firms' future high profitability.

Following Bhattacharya (1979) study, John and Williams (1985) and Miller and Rock (1985) developed Bhattacharya signalling model and reached similar conclusions. They concluded that when managers believe that firm market value does not show genuine reflection on the firm intrinsic value, they have the incentive to signal private information to outside investors through the payments of dividend. Following these studies, many studies' results have accorded with the dividend signalling theory, concluding dividend payments directly affect firm market value (Aharony and Swary 1980; Asquith and Mullins Jr 1986; Healy and Palepu 1988; Aharony and Dotan 1994; Bernheim and Wantz 1995; Michaely et al. 1995; Brook et al. 1998; Travlos et al. 2001; Bali 2003; Salih 2010; Dasilas and Leventis 2011).

On the other hand, studying Japanese firms, Dewenter and Warther (1998) study shows that dividend signalling power has limited effect when compared to US firms. They argue that the Japanese firms are caused to experience less information asymmetry, considering their difference in corporate governance mechanism and ownership structure. Empirical evidence addressed the question of whether the change in dividend payment allows the market to predict future earnings show conflicting results. For example, studies undertaken by Watts (1973), Gonedes (1978), Penman (1983), DeAngelo et al. (1996) and Benartzi et al. (1997) show that dividend is not the best instruments to predict future earnings. Watts (1973) found that across firms, the average estimated coefficients of current dividends, when regressing with the following year earnings, to be positive. However, the average level of significance

was minimum. Gonedes (1978) and Penman (1983) reported similar results. However, when focussing on the relationship between dividend changes and firms future earnings, Benartzi et al. (1997) findings support those of Watts (1973), however, they did not find evidence that change in current dividend payment can predict the change in future earnings, similarly to the findings of DeAngelo et al. (1996).

Challenging Watts's earlier conclusions, Laub (1976) proposed that dividends transport information related to firm future earning beyond those predicted by historical earnings. Pettit (1972) study reported similar results. Moreover, according to Grullon et al. (2005), after controlling for the well-known nonlinear patterns in the performance of earnings, dividend changes did not convey information about future earnings changes. Although Nissim and Ziv (2001) documented a positive relationship between dividend changes and earning changes, the results were only for when dividend payments increase. After controlling for current and expected profitability, they concluded no relationship exists between dividend payment decreases and future profitability. They argue that accounting conservatism could be the result of these findings.

Evidence on the signalling hypothesis also seems stronger when testing the reaction of firm market value to dividend announcement. However, the results are weak for studies testing the hypothesis that dividend payments are used to convey information regarding future earnings. Signalling theory is based on the idea that managers release dividend to transfer information regarding firm future performance; the agency theory concept of dividend contradicts this hypothesis, arguing that managers may have different incentives to hold dividend, rather than paying, and therefore, need to be governed to pay the appropriate amount of dividend.

2.7.1.2. Dividend policy and agency theory

One of the assumptions of Miller and Modigliani (1961) on the perfect capital-market is that managers and investors share the same objectives. However, this assumption does not hold in the real world, where ownership of the firm is separate from its management. Since the separation of ownership and control causes information asymmetry between insiders and outsiders, modern organisation managers are always considered to be inadequate agents of investors. Managers will conduct activities that

are not necessarily profitable to investors but are managerially rewarding. Thus, investors need to monitor managers' activities and, hence, bear the agency cost.

As a way to mitigate the shareholder managers' conflict of interest, dividend payments are used as a tool to reduce the free cash flow available to managers, forcing them to seek external financing and thus making them liable to capital suppliers (Rozeff 1982; Easterbrook 1984; Lloyd et al. 1985; Jensen 1986; Crutchley and Hansen 1989; Dempsey and Laber 1992; Glen et al. 1995; Saxena 1999; Farinha 2003). La Porta et al. (2000) documented that firms pay more dividend in countries where there is better protection against minority shareholders. Another source of agency cost that could be mitigated by the dividend policy is the conflict of interest between shareholders and debtholders. In this case, bondholders are considered the principals, where shareholders are the agents of bondholders' funds. Thus, extra dividend payments to shareholders may be considered bondholders' wealth transforms to shareholders (Jensen and Meckling 1976). Shareholders have access to the firm funds before bondholders; thus, for the bondholder, it is necessary to minimise dividend payments to shareholders (John and Kalay 1982; Ang 1987).

Firm management has the task of making the daily decision that affects firm future earnings. Managers might not always pursue the shareholders' interest when adopting a dividend policy (Pucheta-Martínez and Bel-Oms 2015). In a situation where the agency problem arises, owners would be sceptical about firm free cash flow abuses (Krafft et al. 2013). Jensen (1986) documented how the distribution of dividend reduces the amount of free cash flow in manager's hand, preventing the misuse of cash. Hence, this prevents firms from taking unprofitable projects and eases their agency cost. Easterbrook (1984) theorised that dividend payments would force managers to raise funds through the capital market. Consequently, professional investors (e.g. banks and financial analysists) will act as monitors over managers' activities. In this case, shareholders can monitor managers' behaviour at low monitoring cost. It proposes that managers' monitoring can be increased through dividend payments and, hence, reduces managers' acting based on their interest. Conversely, Easterbrook (1984) argues that high dividend payments could provoke managers to increase firm leverage and, hence, raise the level of firm riskiness.

According to Jensen (1986) and Farinha (2003), dividend payout is affected by firm agency cost. They argue that to mitigate firm agency cost, firms offer to pay more dividend to shareholders. Following literature built on the agency theory, studies focused on the role corporate governance mechanism on firm payout policy and, more importantly. study the impact of the board of directors' composition effectiveness (Belden et al. 2005; Sharma 2011; Wellalage et al. 2012).

2.8. Board of directors and payout policy

Board of directors play a pivotal role in firms' corporate governance mechanisms and monitoring top-management decisions. After all, a firm's payout policy is a major decision made by top-management. According to Bhattacharya (1979) signalling theory, managers hold more information about firm future earnings than shareholders and aim to signal information to shareholders through their dividend policy (Bhattacharya 1980; Healy and Palepu 1988; Gugler 2003). Sudden changes in firm payout policies are exercised to ease the information asymmetry problem between managers and shareholders (Frankfurter and Wood Jr 2002). However, under the agency theory perspective, firm dividend payments are used as an essential controlling mechanism to mitigate firm agency cost (Jensen 1986; Fenn and Liang 2001; Byoun et al. 2016). As a result of the separation of control, shareholders prefer dividend payments to retained earnings to avoid management misuse of excess cash (Rozeff 1982).

Baker (2009) argues that the variation in the agency problem setting affects shareholders' expectations of dividend payments. There are two conflicting views, grounded on the agency theory, explaining the relationship between firm corporate governance and payout decisions: the outcome view and the substitute view. The outcome view highlights the managers' incentives to retain more cash to serve their own interests and emphasises the role of strong governance to induce dividend payments (Jensen 1986; La Porta et al. 2000). Moreover, Adjaoud and Ben-Amar (2010) studied the relationship between corporate governance quality and firm dividend payments and found that strongly governed firms have a high dividend payment. Other studies also support the outcome view (Mitton 2004; Kumar 2006; Adjaoud and Ben-Amar 2010; Jiraporn et al. 2011).

Contradicting the outcome view, La Porta et al. (2000) report that there is an inverse association between shareholder protection and dividend payments (substitute view). This argument is based on firms establishing a reputation in the market of not exploiting shareholders. The need for firms to establish reputation is higher for firms with weak shareholder protection. A follow up study by Jiraporn and Ning (2006) investigating the relationship between shareholders' right and dividend policy, found that firms with weak shareholders' right pay more dividend. Based on the argument that dividends are used as a substitute for shareholder rights, several studies report results are consistent with this argument (Jiraporn and Ning 2006; Chae et al. 2009; Jo and Pan 2009; Setiawan and Kee Phua 2013).

Both board composition and payout policy are mechanisms used to mitigate conflict of interest between managers and shareholders; therefore, extent literature argues on the relationship between the two mechanisms. Using board of directors as a monitoring mechanism, studies shows a strong relationship between the firm board of directors' composition and firm payout policy (Schellenger et al. 1989; Abdelsalam et al. 2008; Adjaoud and Ben-Amar 2010). Hu and Kumar (2004) found a positive association between firm board independence and dividend payout. Other studies have also confirmed board independence role in enhancing firm divided policy (Setia-Atmaja 2010; Sharma 2011). Moreover recent studies have also examined the effect of board diversity on dividend payment and find that a diversified board improves board monitoring and increases firm dividend payment (Pucheta-Martínez and Bel-Oms 2015; Byoun et al. 2016; Al-Rahahleh 2017; Chen et al. 2017).

Previous studies on the role of board composition on payout policy mainly focus on board independence, board size, CEO duality and board diversity. Extant literature also argues that financial-experts on board serve by improving board monitoring and advisory role, giving their higher expertise in monitoring firm financial information and playing an important role in providing effective advice by giving their higher expertise in monitoring firm financial information and reporting quality. However, considering the conflicting views on how corporate governance affects payout policy (outcome vs substitute), the relationship between financial-experts and firm payout policies still remains unclear. For this reason, the final theme

of this study explicitly focusses on the relationship between financial experience of directors on the board and firm payout policy.

2.9. Conclusion

This chapter focussed on describing the relevant literature relating to the role of board of directors, stock price synchronicity, cash holding and payout policy. In summary, board of directors has the highest authority in the firm governance system, thus they play a significant role in establishing the firm policies and in decision-making. Many theories attempt to explain the main role of board of directors on board including the agency theory, resource dependency theory and stewardship theory. From previous literature, the board of directors performs the two leading roles of monitoring and advising managers, emphasising board of directors' composition role in board of directors' effectiveness. Following a recent regulation demand for more financial experts on board and the increase in firm appointment of financial-expert directors, recent studies investigate the role of directors' financial experience effectiveness. This study investigates how financial-experts on the board affects firm stock price synchronicity, measuring stock price informativeness, and top management main financial decisions regarding cash holding and payout policy.

The level of firm-specific information embedded in the share price is affected by a wide range of variables. It can be argued that financially sophisticated boards could affect stock price synchronicity by increasing the monitoring effectiveness over managers, which makes them more transparent and/or by changing the nature and dynamics of the board, which makes board members pay more attention to the quality of information reported. Moreover, enhancing board monitoring and advisory role through the increase of board financial expertise would also affect firm key financial decisions. Firm decisions on the level of cash holding and payout policy are one of the major decisions taken by managers and supervised by board of directors. Previous literature proved the direct influence a board of director composition has, as a monitoring mechanism, on enhancing firm financial decision making. Thus, this study also examines the effect financial expiries have on managers' behaviour towards firm cash holding and payout policy. The next chapter, however, provides a comprehensive examination and discussion of the financial expertise of directors and their effect on stock price synchronicity.

Chapter 3: Examining financial expertise on board of directors and stock price synchronicity

3.1. Introduction

Following the accounting scandals of Enron and WorldCom in the early 2000s, the role of information transparency in preventing financial manipulation and frauds was debated. Consequently, to restoring public confidence, the Sarbanes-Oxley Act (SOX) was enacted in 2003, ensuring that corporate boards have a sufficient number of directors who understand " … generally accepted accounting principles and financial statements … " and thus have the competence in protecting shareholder interests.[7] Despite a plethora of studies examining the link between directors' financial experience and accounting manipulation (see, e.g. Xie et al. (2003); Abbott et al. (2004); Agrawal and Chadha (2005); Güner et al. (2008)), the question of whether such financial directors are conducive to enhancing the firm's information environment remains unclear. This chapter fills this gap by examining the information content of firm stock prices.

Arguably, directors with financial expertise could enhance a firm's information environment through better and efficient monitoring. As delegated monitors, it falls within the remit of directors to review the firm's financial statements, audit process, and internal control mechanisms, and such tasks often require a certain degree of financial knowledge. Compared to non-experts, financial-expert directors are in a better position to monitor management because their prior experience allows them to acquire financial information at lower costs and to process such information with relative ease (Harris and Raviv 2008). Prior evidence also shows that directors who have had experience working in the financial industries are likely to be more competitive and have better skillsets, suggesting that financial experience is likely to

[7] For the definition of audit committee financial expertise, please refer to Section 407 of the Sarbanes-Oxley (2002) Act. This stipulates that "each issuer (...) to disclose whether or not, and if not, the reason therefore, the audit committee of that issuer is comprised of at least 1 member who is financial expert". Similarly, all major stock exchanges have introduced listing requirements on director financial literacy. Please also see the survey by Jensen et al. (2004), e.g. recommendation R-36. Moreover, in the UK, the Smith Committee report (2003) recommends financial expertise on corporate boards and proposes that "at least one member of the audit committee should have significant, recent and relevant financial experience".

be indicative of their superior technical abilities (Klein 2002). As such, boards that have more financial-expert directors, and thus are better-informed, could possibly function more effectively than other boards in deterring managerial information hoarding and/or accounting manipulations, which in turn facilitates a better information environment.

Financial-expert directors also enhance information environment through their advisory role. As pointed out by Adams and Ferreira (2007), directors tend to consume a greater portion of their time in serving the firm in their advisory capacity than their monitoring role, such as giving advice on the firm's investment decisions. To facilitate an effective advisory function, the board must ensure that financial information is accurate and timely to ascertain that directors are well informed about the costs and benefits of existing and future projects. Because financial-expert directors process financial information with lower costs, rely more on such information to support their advisory function, and are shown to be better advisors,[8] it can be argued that boards with more financial-expert directors sense a greater need to enhance information quality and, as a result, expend more resources and effort in fostering a better information environment.

To test the study hypotheses, this chapter measures the quality of the firm's information environment by the amount of firm-specific information embedded in its stock prices. The rationale is that when the firm's information environment improves, its stock prices will incorporate greater variation in firm-specific factors and thus synchronise less with market factors (Roll 1988). A growing body of empirical studies have confirmed that stock price informativeness improves with the quality of corporate disclosure (Shi and Kim 2007; Haggard et al. 2008; Kim and Shi 2010; Song 2015) and informational transparency (Jin and Myers 2006). Following extant literature (Morck et al. 2000; Piotroski and Roulstone 2004; Gul et al. 2010; Gul et al. 2011; Xu et al. 2013; Boubaker et al. 2014), this study estimates an expanded market model and employs the logistic-transformed R^2 to capture stock price synchronicity.

[8] Prior studies show that financial-expert directors give better advice, such as in identifying Mergers and Acquisition (M&A) opportunities, balancing the cost and benefits of merger deals Huang, Q. et al. 2014. The role of investment banker directors in M&A. *Journal of Financial Economics* 112(2), pp. 269-286., and rendering better corporate risk hedging decisions Dionne, G. and Triki, T. 2005. Risk management and corporate governance: The importance of independence and financial knowledge for the board and the audit committee. *Available at SSRN 686470*.

A higher synchronicity reflects less firm-specific information in stock prices, or a lower information environment.

Using a sample of 1,078 US publicly listed firms over the period from 1999 to 2016, the study examines the relation between the fraction of financial-expert directors on corporate boards and their stock price synchronicity. Following prior studies (see, e.g., Güner et al. (2008); Minton et al. (2014); Fernandes and Fich (2016), financial-expert directors are defined as those who (1) have prior experiences as executives in banking and financial institutions, finance-related positions in nonfinancial firms, or professional investors (henceforth, "*accounting financial directors*") and (2) those who have non-accounting positions supervising the financial reporting functions, such as Presidents and CEOs (henceforth, "*non-accounting financial directors*"). The study tests reveal that the fraction of accounting financial directors is negatively and significantly associated with stock price synchronicity, suggestive of better information environment. However, the study finds little evidence of a significant association of the fraction non-accounting financial directors with stock price synchronicity.

A potential concern arising from the overview discussed earlier in chapter two noted that the relation between board financial expertise and stock price synchronicity could be endogenous. For example, the study estimates could be biased if omitted variables that affect the fraction of financial-expert directors on board of directors and stock price informativeness are present. The study's results would also be subject to the reverse causality concern if firms with superior information environment are more appealing and able to recruit directors with better qualifications and financial experience. To address these concerns, this chapter exploits the plausibly exogenous increase in the fraction of financial-expert directors on boards brought by the 2003 NYSE and NASDAQ listing rules, mandating that boards without majority independence must appoint new independent directors. Since boards without financial-expert directors prior to the enactment are more likely to have new financial directors brought in as a result of the mandatory changes, the study finds that such boards experience a marginally significant reduction in price synchronicity in the one and two years after the new listing rules took place. This evidence suggests that endogeneity is unlikely to fully explain the study results.

To obtain further understanding of the role of financial-expert directors in shaping the firm's information environment, this chapter test the effect financial-experts have on firm crash risk and found that even though accounting financial-experts reduce firm stock price synchronicity, they have no effect on CEOs' ability to withhold bad news disclosure, resulting in crash risk. This chapter also explores the cross-sectional heterogeneity in the relation in question across firms with different governance characteristics. The results show that the negative relation between financial-expert directors and price synchronicity is more pronounced among firms with a chairman-CEO, low institutional ownership, and a low threat of takeover (measured by the antitakeover index), where governance and monitoring are most needed. This evidence is consistent with better monitoring by financial-expert directors improving firms' information environment. Finally, this study examines the types of directors and shows that the significant relation stems from those financial-expert directors who are independent and have many outside directorships.

The study contributes to the finance literature on the effectiveness of financial-expert directors serving on the board of directors in several ways. First, the new trend of increasing financial expertise on the board of directors provides an opportunity to investigate financial expertise effectiveness. It is the board of directors who have main responsibility of supervising the firm's financial reporting process (Klein 2002). However, recent studies considered the financial expertise of corporate audit committees (McDaniel et al. 2002; Davidson et al. 2004; Mangena and Pike 2005; Carcello et al. 2006b) or on banks' boards (Fernandes and Fich 2009; Minton et al. 2014). In view of these responsibilities, this study contributes to corporate board composition effectiveness to enhance firm information environment through the appointment of directors with financial experience to serve on the board. Second, the study adds value to the limited literature on the effect of board composition on stock price informativeness. Previous literature primarily focuses on the role of board independence, board gender diversity, board size, and CEO duality (Ferreira et al. 2011; Gul et al. 2011; Ntow-Gyamfi et al. 2015; Sila et al. 2017). To the best of the researcher's knowledge, this study is one of the few existing studies that attempts to link financial experience of directors to the firm's information environment. Third, the study results challenge the SOX Act's definition of financial experience which includes "supervising" employees with financial reporting responsibilities. In fact,

directors with CEO- and Chairman-experiences failed to have the same positive influence when compared to directors with prior financial reporting responsibilities (accounting financial experience). Finally, the study results offer empirical justification to the increasing calls by policymakers for more financial-expert directors on boards to prevent accounting manipulations and fraud.

The remainder of this chapter is organised as follows: Section 3.2 provides a brief review of the literature on the relationship between board of directors' financial experience and stock piece synchronicity; Section 3.3 forms the hypothesis to be tested; Section 3.4 presents the study's methodology adopted and describes the sample and dataset; Section 3.5 defines the study methodology; Section 3.6 outlines and discusses the study's empirical results; Section 3.7 concludes the chapter.

3.2. Hypothesis development

Many of the recent corporate governance debates have developed around the composition of the corporate board, raising the question of which type of directors better serve the interest of shareholders. In modern-corporations, one of the major investors' concerns lies in the excrescence of information asymmetry problem between shareholders and managers, causing accounting manipulation, fraud and misleading financial reporting. Following policymakers' call for the importance of financial-experts on board under the assumption that financial-experts have better understanding of firm financial reporting and thus serve as better informed directors, recent studies on board of directors' effectiveness show serious attention to the effect of directors financial experience (see, e.g., Xie et al. (2003); Abbott et al. (2004); Agrawal and Chadha (2005); Güner et al. (2008). However, examining the empirical effect of directors' financial experience has on enhancing firm information environment still remains unclear and under-researched.

In an efficient market, share prices incorporate and reflect all information related to a firm. It assumes that all market participants share the same information and the cost of production and gathering this information in the market is relatively low. However, firm-specific information is costly and investors will only expand resources spent on acquiring information if they believe that the benefit will offset the cost (Grossman and Stiglitz 1980). Roll (1988) argues that the level at which share

price moves together is related to the percentage of firm-specific information to market and industry-wide information embedded in the price. Increasing firm-specific information in the markets leads stock return to be less reliant on industry and market-wide information and, thus, less synchronised. Thus, to study financial-expert directors' effect on firm information environment, this study empirically investigates the link financial-experts on board have on firm stock price informativeness.

A large body of research shows that the board of directors' composition affects firms' information environment and decision making. For example, Lim et al. (2007) document a positive association between board independence and firms' voluntary disclosure. Vafeas (2000) indicates that the earnings of firms with small boards are more informative. Other studies also showed that board composition is related to voluntarily disclosure (Cheng and Courtenay 2006; Chau and Gray 2010), accounting conservatism, (Ahmed and Duellman 2007; García Lara et al. 2007), borrowing structure (Stearns and Mizruchi 1993), cost of corporate borrowing (Fields et al. 2012), information asymmetry (Kanagaretnam et al. 2007; Rutherford and Buchholtz 2007; Ferreira et al. 2011; Gul et al. 2011), financial statement fraud (Beasley 1996), earnings manipulations (Dechow et al. 1996), earning management (Klein 2002; Jaggi et al. 2009) and accounting report integrity (Anderson et al. 2004). However, most of the earlier studies focus on board independence, board size, CEO duality and board gender diversity.

According to Klein (2002), directors' experience is an indicator of directors' ability and skills to identify firms' issues. Board of directors has initial responsibility for supervising the firm's financial reporting process. Board review firm financial statement, audit process and internal control mechanism through regularly meeting the firm external auditors and accounting executives. Debatably, Harris and Raviv (2008) argue that, among independent directors, financial-expert directors have lower cost in obtaining information relating to the complexity of the financial transactions and thus are more capable of effectively monitoring executive management. Moreover, Francis et al. (2012a) study the direct effect of outside directors' financial experience on firm stock return in the U.S market during the financial crisis. The relationship was based on the idea that outside financial-experts deliver a more sophisticated understanding of financial information that is critical for effective board monitoring and mitigating

agency problem between firm managers and shareholders, which effect firm informational environment and stock retune. Also, Gray and Nowland (2015) link directors with accounting and consultant bankers' experience to higher shareholders' value, where DeFond et al. (2005) found a positive market reaction following appointing financial-experts on the audit committee. Thus, it could be argued that there is a direct negative relationship between appointing directors with financial experience and stock price synchronicity.

Studying financial-experts' monitoring role, Jeanjean and Stolowy (2009) show that financial expertise on board of directors is positively related to board independence, ownership concentration and institutional ownership. This is in line with firm better corporate governance. According to Sharma et al. (2009), the level of audit committee meeting frequency is positively related to financial experience when the risk of financial misreporting is high; that is, when the financial expertise is most needed. Xie et al. (2003) reported that the presence of financially sophisticated directors constrains the propensity of managers to engage in earning management. They argue that this could indicate that financially sophisticated directors act as better monitors. Some studies successfully showed that financial expertise is negatively linked to the firm engaging in earnings management (Xie et al. 2003), fraud (Agrawal and Chadha 2005) and restatements (Abbott et al. 2004). These factors are associated with better firm corporate governance. Increasing shareholder protection through monitoring will result in improving firm information environment and thus reducing stock price synchronicity (Morck et al. 2000).

Prior literature shows that financial-experts affect firms' outcome beyond better information disclosure and audit committee performance. Directors use most of their time in the firm on their advisory role rather than their monitoring role (Adams and Ferreira 2007). Several studies have, indeed, questioned the directors' conflict of interest and found that not all financial-expert directors have the incentive to protect shareholders' interest (Güner et al. 2008); in October 2008, a new directors' duty (the Companies Act 2006 (the "Act")) was placed on directors to avoid positions in which conflict of interest may arise (situational conflicts) and/or disclose any interest in a proposed or existing transaction or arrangement with the company (transactional conflict). Minton et al. (2014) also show that financial-experts on bank board of

directors were unable to alleviate the consequence from the 2007 financial crisis. When studying the board financial-experts' advisory role free of potential conflict of interest, Huang et al. (2014) found that financial-experts are able to identify better Mergers and Acquisition (M&A) opportunities and reducing costs of the deals. Dionne and Triki (2005) also show that financial expertise on board encourages firm risk hedging. It could be argued that, in order for financial-experts to govern and advise effectively, directors must be better informed about firm activities. As a result, the quality of firm information environment improves over time. Consequently, increasing firm-specific information in the market results in decreasing firm stock price synchronicity.

Moreover, viewing the board as a decision-making group allows to link psychological perspectives to financial expertise influence on board decisions. According to the influential theory of group performance, group decision making quality is influenced by the level to which group members cooperatively acquire relevant, useful resources (Hackman 1995). In groups, responsible for making complex decisions, knowledge resources are of importance (Littlepage et al. 1997; Faraj and Sproull 2000; Espinosa et al. 2007). Related studies show that group decision-making quality is determined by the collective relevant task knowledge and experience of the group individual members (Kerr and Tindale 2004; Woolley et al. 2008). Previous research frequently conceptualises group experience and ability as the sum of their individuals' experience (Faraj and Sproull 2000; Reagans et al. 2005; McDonald et al. 2008; Woolley et al. 2008). Thus, this study argues on the fraction of financial-expert board directors' effect on firm stock price synchronicity. Following on the previous discussion, this study formulates the following hypothesis:

Hypothesis 1: the fraction of accounting financial-expert directors on board are negatively related to firm stock price synchronicity

As proposed in the SOX Act, addition to financial-expert definition, all directors with previous experience supervising financial-experts are labelled as financial-expert directors. This definition does not specify but includes all directors with previous experience as firms' CEOs or presidents. Although there are no studies assessing directors' non-accounting financial experience effect on firm financial information, the effect of CEOs' accounting financial experience on the firm

information environment is widely studied. According to Matsunaga and Yeung (2008), CEOs with previous CFO experience improve the quality of firm financial disclosure. Similarly, Jiang et al. (2013) found a positive relationship between CEOs' financial experience and the precision of earning information and quality of financial statement. If previous financial-experts' supervision gives the directors financial experience, CEOs with previous accounting financial experience should not have any different effect from CEOs without accounting financial experience. Yet, literature distinguishes between the two types of CEOs' effect on firm informational environment. Moreover, DeFond et al. (2005) examined the market reaction to the announcement of financial expertise appointed onto the board of directors' audit committee. They find a positive reaction around the appointment of accounting financial expertise but not around that appointment of non-accounting financial expertise or directors with no financial expertise. Their findings are in line with the idea that only accounting financial expertise is seen to improve firm governance. Thus, this study argues that directors with non-accounting financial experience would not influence firm informational environment, resulting in no improvement in reducing a firm stock price synchronicity. Following the previous discussion, the study hypothesises the following:

Hypothesis 2: the fraction of non-accounting financial-expert directors on board are unrelated to firm stock price synchronicity.

3.3. Data and variables construction

3.3.1. Sample and Scope

The study's sample selection includes all publicly listed non-financial Standard & Poor's (S&P) 1500 companies over the period from 1999 to 2016. The period begins in 1999 because it was when BoardEx commenced having relatively stable data coverage. Directors' characteristics, such as their work experience, and other attributes of the boards are collected from BoardEx. To estimate stock price informativeness, stock information was collected from the Center for Research in Security Prices (CRSP) database and the asset pricing factors from Fama-French Data Library. Accounting information is downloaded from Compustat. Industry classification follows the Fama-French 48-industry classification. The study excludes financial

firms from the sample, reducing the numbers of firms to 1,292 firms. After further discarding missing observations, the final sample consists of 1,078 firms and 13,936 firm-year observations (see Table 3.1 for more details). To reduce the effect of outliers, all continuous variables are winsorised at the 1st and 99th percentiles.

Table 3. 1 Selection criteria for the sample

Analysis of sample attrition at different stages of sample.

Criterion	# of firms
All firms in the S&P 1500	1,500
Financial firms	208
Missing data firms	214
Sample (excluding finance firms and missing data firms)	1,078

3.3.2. Variable definitions

This section presents the dependent and control variable definitions for the issue under investigation. The independent variable (directors' financial experience) was described previously in Section 2.3.3. The discussion focuses first on the stock price synchronicity measures, explaining the definition of stock price synchronicity by Roll (1988) and developed by Morck et al. (2000). In addition, the control variable measures provide information about all of the variables employed in this part of the study.

3.3.2.1. Measuring stock price synchronicity

Following Piotroski and Roulstone (2004), Gul et al. (2010), Xu et al. (2013), An and Zhang (2013), Boubaker et al. (2014) and as proposed by Roll (1988) and further developed by Morck et al. (2000), the stock price synchronicity is measured by each individual firm's market model regression. The model allows us to decompose the variation of firm total return into returns tied to market- and industry-wide information and return tied to firm-specific information. For each stock in a given year, the study estimates the following model:

$$R_{i,W} = \alpha + \beta_1 MR_{w,t} + \beta_1 MR_{w,t-1} + \beta_2 INR_{w,t} + \beta_2 INR_{w,t-1} + \varepsilon_{i.t} \quad (1)$$

where , for firm *i* and week *w, R* signifies the firms' weekly return. $MR_{w,t}$ denote the value-weighted A-share market return based on the S&P 1500 index on day *t* and $INR_{w,t}$ denote the value-weighted industry return. Following Boubaker et al. (2014) and Gul et al. (2010), for a firm to be included in the sample, it must have at least 30 weeks of observations. The individual firm's return index data, the value weighted market return and the value weighted industry return were retrieved from CRSP database. The value weighted market return MR_w is calculated, using the following equation:

$$MR_w = \sum Firm\ return\ index * \left(\frac{Firm\ market\ capitalisatio}{Total\ market\ capitalisation}\right) \quad (2)$$

as the total return index of all firms in the market index multiplied by the fraction of the firm's market capitalisation to the total market capitalisation. On the other hand, the INR_w is calculated as the total of all firms' return indices in the firm *i* industry multiplied by the fraction of the firm's market capitalisation to the total industry capitalisation as follows:

$$INR_w = \sum Firm\ return\ index * \left(\frac{Firm\ market\ capitalisatio}{Total\ industry\ capitalisation}\right) \quad (3)$$

the R^2 statistic is calculated individually for each firm using (Eq. 1). The regressed R^2 explains the level of variation in the firm's return tides to the market and industry return. Nevertheless, the R^2 attained from the regression bounded within the unit interval and cannot be used as an independent variable. Following Morck et al. (2000) and Piotroski and Roulstone (2004) and Xu et al. (2013), this study apply a log-transformation of R^2 to allow the variable to vary from negative infinity to positive infinity, giving a dependent variable with a better normal distribution. Thus synchronicity measures as follows:

$$SYNC = \log\left(\frac{R^2}{1-R^2}\right) \quad (4)$$

where the $SYNC$ is the study empirical measure of firm annual synchronicity. A lower value in $SYNC$ indicates that a firm's stock price incorporates more firm-specific information and thus a better information environment.

3.3.2.2. Control variables

The study includes a list of firm- and industry-related control variables that were identified as influential on stock price synchronicity in the relevant literature. These variables include: leverage, volume, firm size, stock return volatility, market-to-book ratio board structure and directors' characteristics.

Firm Size: according to Skaife et al. (2006), large firms are usually associated with better and larger information environment. However, compared to small firms, large firms have better opportunities to diversify their risk across the market, resulting in their trades being more synchronised with the market. According to Roll (1988) study, large firms incorporate more market-wide information than small firms. His study establishes a positive relationship between firm size and stock price synchronicity. Moreover, Piotroski and Roulstone (2004) argue that small firms rely on large firms' actions as indications of macroeconomic events; this results in large firms' stock price synchronicity to rise. Firm size is calculated as the logarithm of the firm market capitalisation at the end of the fiscal year.

Leverage: previous studies have shown the important role of financial leverage in determining the stock price volatility and cross-sectional variation. According to Hutton et al. (2009), levered forms shift their risk from shareholders to debtholders bearing them higher idiosyncratic volatility, which reduces the firm stock price synchronicity. Inversely, Rajgopal and Venkatachalam (2011) argue that higher leverage increases firms' exposure to financial distress and thus increases their return volatility. The study measures leverage as the firm total book liability divided by the firm total assets at the end of the fiscal year.

Market-to-book ratio (M/B) of equity: the firm M/B ratio is a measure of firm growth opportunity. Firms with high growth opportunities are more difficult to evaluate and hence suffer from high information asymmetry (Francis et al. 2012b) and are likely to experience higher stock return volatility (Rajgopal and Venkatachalam 2011). In contrast, Hasan et al. (2014) argue that firms with high growth opportunities incorporate more firm-specific information, resulting in low stock price synchronicity. The M/B ratio is calculated as the market value of equity (market capitalisation)

divided by the book value of equity (total assets minus total liability) at the end of the fiscal year.

Volume: according to Easley et al. (1996), firms with a high trading volume, (high shares traded in the fiscal year) have a higher probability of information events than those of low volume trading. This indicated that trading volume is negatively related to stock price synchronicity. Moreover, Alford and Berger (1999) state that, since trading volume plays as a proxy of the brokerage commissions, higher trading volume will result in security analysis being more incentive to supply more information. Firm trading volume is calculated as the sum of shares traded in a year, divided by the sum of shares outstanding at the end of the fiscal year.

Stock return volatility: for firms with high return volatility, the probability of the expected return provisional on private and public information highly deviates from the expected return provisional solely on public information, and, thus, requires generating more firm-specific information (Bhushan 1989). Chan and Hameed (2006) point out that firms with high volatility return have a more prosperous information environment. Therefore, their share price will be more independent from market and industry effect. The volatility of firm earnings is calculated as the standard deviation of their daily return over the fiscal year.

Other control variables: the study also includes the number of firms in the industry to which the firm belongs *(NINA)* to control the difference in sample size effect that might be reflected on the stock price synchronicity (Durnev et al. 2003; Boubaker et al. 2014). The industry number of firms is calculated as the natural logarithm of the total number of firms in the industry to which a firm belongs. Moreover, to control the industry and year fixed effects, industry and year dummies are added to the regression.

3.4. Methodology

3.4.1. Empirical model

To examine the impact of board financial experience on stock price synchronicity, the study estimates the following model: [9]

$$SYNC_{i,t} = \beta_0 + \beta_1 \, Fraction\ of\ financial\ expert\ directors_{i,t} + \gamma \, Controls_{i,t} + YearFE + FirmFE + \varepsilon_{i,t} \quad (5)$$

where $SYNC_{i,t}$ is the stock price synchronicity measured by each firm R^2 logistic which explains the level of variation in the firm's return tides to the market and industry return. Similar stock price synchronicity measure is found in previous studies on stock price synchronicity (i.e. Morck et al. (2000) Piotroski and Roulstone (2004) and Xu et al. (2013). $Fraction\ of\ financial\ expert\ directors_{i,t}$ is the study main variables of interest and is either the fraction of accounting financial-expert directors or the fraction of non-accounting financial-expert directors. $Controls_{i,t}$ is a vector of firm controls as defined in Section 3.4.1.2. To reduce the effects of outliers, all continuous variables are winsorised at the 1st and 99th percentiles.

The study also follows previous stock price synchronicity studies and other financial studies and includes year and firm fix effect Firm and year fixed effects are included (see, e.g., Gul et al. (2010); Boubaker et al. (2014). Considering that the study variables may change over the study period, the year fixed effect controls for the trends of financial expertise on board and firm stock price synchronicity, where the firm fixed effect to reflect factors related to specific firm that could influence the determinants of stock price synchronicity.

3.5. Descriptive Analysis

This section provides the descriptive analysis through a summary of the sample characteristics and variables summary statistics and correlation.

[9] A similar approach is used by previous studies relating corporate governance to stock price synchronicity (e.g. Gul et al., 2010; Boubaker et al., 2014)

3.5.1. Sample Characteristics

This section provides sample characteristics through descriptive analysis of the number of observations spread through the sample years, yearly summary (mean) of the percentage of financial-experts on board and sample firm industries' distribution.

Table 3.2 panel A shows the number of observations spread through the sample period. The number of firm observations start at only 35 firms in 1999 and increase yearly to reach 1022 firms in 2016 with a total of 13,936 firm-year observation[10].

Table 3. 2 Descriptive statistic

The study sample contain 1,078 firms from S&P 1500 non-financial firms and 13,936 firm-year observation over the period from 1999 to 2016.

Panel A: number of observation spread through the years

Year	Number of firm obs.	% of firm obs. from the total sample.
1999	35	0.3%
2000	467	3.4%
2001	549	3.9%
2002	570	4.1%
2003	685	4.9%
2004	745	5.3%
2005	783	5.6%
2006	810	5.8%
2007	850	6.1%
2008	854	6.1%
2009	868	6.2%
2010	900	6.5%
2011	919	6.6%
2012	947	6.8%
2013	969	7%
2014	970	7%
2015	993	7.1%
2016	1,022	7.3%
Total	13,936	100%

[10] The sample start in 1999 based on BoardEx data availability. Even though year 1999 have a substantial lower firm observations excluding this year have no effect on the study main results or robust checks. However, these results are not reported in this study.

Table 3. 3 Descriptive statistic (continue)

Panel B: yearly sample mean and change of mean of the fraction of financial-experts on board

Year	Frac. of Acc. Fin. Exp. Dir.	Frac. of Acc. Fin. Exp. Dir. Change	Frac. of Non-Acc. Fin. Exp. Dir.	Frac. of Non-Acc. Fin. Exp. Dir. Change
1999	10.7%	-	5.0%	-
2000	10.7%	0.0%	6.2%	1.3%
2001	12.1%	1.4%	7.0%	0.8%
2002	13.7%	1.6%	7.6%	0.6%
2003	16.5%	2.8%	8.9%	1.3%
2004	18.8%	2.3%	8.8%	-0.1%
2005	20.9%	2.1%	9.5%	0.7%
2006	22.7%	1.7%	10.1%	0.5%
2007	24.5%	1.8%	10.5%	0.5%
2008	26.6%	2.1%	10.9%	0.4%
2009	28.9%	2.3%	11.4%	0.5%
2010	30.7%	1.8%	12.0%	0.6%
2011	33.0%	2.4%	12.9%	0.9%
2012	35.3%	2.2%	14.0%	1.0%
2013	37.7%	2.4%	15.4%	1.4%
2014	40.3%	2.6%	17.4%	2.0%
2015	43.1%	2.9%	19.5%	2.1%
2016	46.0%	2.8%	21.4%	1.9%
Avg.	26.2%	2.1%	11.6%	1.0%

Panel C: Sample industry firm distribution based on Fama-French 10 industry classification.

Industry	No. of firms obs.	%of firms	No. of firm year obs.	% of firms	Average Frac. of Acc. Fin. Exp. Dir. on board	Average Frac. of Non-Acc. Fin. Exp. Dir. on board
Durables	28	3%	349	3%	27%	11%
Energy	51	5%	696	5%	27%	14%
High Tech	203	19%	2,712	19%	28%	12%
Healthcare	112	10%	1,406	10%	25%	13%
Manufacturing	201	19%	2,676	19%	28%	12%
Non-Durables	76	7%	937	7%	26%	14%
Other	165	15%	2,083	15%	29%	13%
Shops	160	15%	1,963	14%	27%	12%
Telecom	23	2%	212	2%	27%	15%
Utilities	59	5%	902	6%	32%	14%
Total	1078	100%	13,936	100%		

Panel B on Table 3.3 reports the average values in the board fraction of financial-experts by year. The statistics show that the fraction of accounting financial-expert directors increases steadily over the sample period. With an average annual percentage change of 2.1%, its mean value is 10.7% in 1999 and 2000 and increases to 26% in 2016. In respect of non-accounting financial-expert directors, an increasing trend is similarly observed; its average value is 5% in 1999 and reaches 21.4% in 2016, implying an average annual percentage growth of 1%. Note also that the fraction of accounting financial-expert directors is always higher (in both levels and percentage changes) than that of non-accounting financial-expert directors.

Panel C presents a sample breakdown by Fama-French 10-industries (financials excluded). The statistics show that technology and manufacturing firms have the highest coverage (19% of the observations), followed by firms in the Others and Shop industries. The average *Frac. of Acc. Fin. Exp. Dir.* is the highest for Utilities firms (an average fraction of 32%), followed by Others industry (an average fraction of 29%). Non-Durables industry firms have the lowest *Frac. of Acc. Fin. Exp. Dir.* with an average fraction of 26%. As for *Frac. of Non-Acc. Fin. Exp. Dir.,* the highest average is found in Telecom firms, with an average of 15%, followed by Utilities, Non-Durables, and Energy firms, and the lowest is observed for Durables-goods industry firms.

3.5.2. Summary Statistics and Correlation

This section provides the variables used (in this part of study) summary statistic, univariant analysis and correlation coefficient. Table 3.4 provides the descriptive statistic of the study main variables. The mean (median) value of R^2 is 0.351 (0.340) higher than 0.193 (0.148) in Piotroski and Roulstone (2004) sample of US firms. The mean (median) of the dependent variable *SYNCH* has the value of -0.726 (-0.665) which is higher than reported in Piotroski and Roulstone (2004) study, which documented a mean (median) of -1.742 (-1.754). This suggests that stock prices of US share prices in this study sample integrate more firm-specific information when compared to Piotroski and Roulstone (2004) US sample shares. This could be because of the different time scale between the two samples' studies. As Piotroski and Roulstone (2004) study estimate US firms stock price synchronicity between 1984 and 2000, this study uses the time scale between 1999 and 2017. Furthermore, R^2 and

SYNCH have a standard deviation of 0.168 and 0.878, respectively. This implies that the stock price synchronicity displays considerable cross-sectional variation in this sample.

Table 3.4 Panel B shows the summary statistic of different financial experience measures. Among directors, the mean of the *Frac. of Acc. Fin. Exp. Dir.* is higher than the mean on *Frac. of Non-Acc. Fin. Exp. Dir*. 0.2970 (with a standard deviation of 0.179) compared to 0.127 (with a standard deviation of 0.120) respectively. This suggests that on board of directors the *Frac. of Acc. Fin. Exp. Dir.* are higher than the Frac. of *Non-Acc. Fin. Exp. Dir*. and both the *Frac. of Acc. Fin. Exp. Dir.* and the *Frac. of Non-Acc. Fin. Exp. Dir.* display considerable cross-sectional variation in this sample.

Panel C on Table 3.4 summarises the study control variables related to firms' financial information (control variables). The study sample size includes both high and low *LEV* firms (mean and standard deviation of 0. 214 and 0.168 respectively) with a 5th percentile of 0.000 and 95th percentile of 0.508. The sample also includes high and low *M/B* ratio firms (mean of 3.481 and standard deviation of 3.579) with a 5th percentile of 0.929 and 95th percentile of 9.278. The sample also includes small and large firms. The firm *SIZE* (with mean of 7.845 and a standard deviation of 1.582) holds 5th percentile of 5.529 and 95th percentile of 10.733. The sample includes firms with high share trading *VOLUME* (with a mean and standard deviation of 0.201 and 0.139 respectively) but relatively low *SDRET* (with a mean and standard deviation of 0.024 and 0.011 respectively). Sample firms derive from industries constructed from a large and small number of firms with *Log(NIND)* mean of 4.676 and standard deviation of 0.913.

Table 3.5 presents the univariate comparison (mean and median breakpoint) based on the *Frac. of Acc. Fin. Exp. Dir*. Results show that firms with high *Frac. of Acc. Fin. Exp. Dir.* tend to have higher *SYNCH* then those with low *Frac. of Acc. Fin. Exp. Dir*. Moreover, firms with high *Frac. of Acc. Fin. Exp. Dir*. tend to have higher market capitalisation, market-to-book ratio, trading volume, and financial leverage. However, firms with low *Frac. of Acc. Fin. Exp. Dir.* tend to have high stock return volatility and a high number of firms in the industry to which they belong.

Meanwhile, Table 3.6 reports the correlation coefficient between the main variables used in the study. The correlation matrix provides an insight into the relationship between the study dependent and independent variables. It also specifies a potential multicollinearity problem that might lead to false estimate. Spearman (Pearson) correlation coefficients are shown below (above) the diagonal. Several features of the data are worth highlighting. The relationship between the *Frac. of Acc. Fin. Exp. Dir.* shows a positive magnitude to *SYNCH* and significant at 1% level, inconsistent with the research hypothesis but in line with the study univariate analysis. Moreover, the correlation between *Frac. of Non-Acc. Fin. Exp. Dir.* and *SYNCH* is positive and statistically significant at 1% level. The correlation matrix also shows that all control variables are significantly correlated to *SYNCH* at the 1% level. Other than *VOLUME*, all control variables significant relationship to *SYNCH* is in the expected direction provided by previous literature. Spearman (Pearson) correlation coefficients provide similar results for almost all variables with similar degrees and significance levels[11].

[11] Another way to assess the multicollinearity problem is through calculating the variance inflation factor (VIF) for all independent variables. The VIF results show that the maximum VIF takes the value of 1.63 where the lowest VIF is 1.05. These values are below the 10 rule of thumb threshold provided by Chatterjee, S. and Hadi, A. S. 2015. *Regression analysis by example*. John Wiley & Sons. This indicated that the multicollinearity issue is unlikely to be presented in this study.

Table 3.4 Summary statistic

This table presents the study's variables summary statistic. *SYNCH:* is the stock price synchronicity, measuring the logistic transformation of the reformed market model regression. *Frac. of Acc. Fin. Exp. Dir.*: the fraction of accounting financial-experts on board. *Frac. of Non-Acc. Fin. Exp. Dir.*: the fraction of non-accounting financial-experts on board. Control variables include *SIZE, LEV, M/B, VOLUME, SDRET and Log(NIND)*. *SIZE*: is the firm size calculated as the logarithm of the firm market capitalisation at the end of the year. *LEV*: is the firm leverage calculated as the firm total book liability divided by the firm total assets, all at the beginning of the year. *M/B*: is the firm market-to book ratio calculated as the market value of equity (market capitalization) divided by the book value of equity (total assets minus total liability) at the end of the fiscal year. *VOLUME*: is the firm trading volume calculated as the sum of shares traded in a year divided by the sum of shares outstanding at the end of the fiscal year. *SDRET*: is the firm daily standard deviation in year. *Log(NIND)*: logistic transformation of the number of firms in the industry in which the company belong. All continua's variables are winsorised at the bottom and top 1 % levels.

Variables	Obs.	Mean	Std. dev	5th Pctl	25th Pctl	Median	75th Pctl	95th Pctl
Panel A: Stock price synchronicity (dependent variables)								
R^2	13,936	0.351	0.169	0.089	0.222	0.340	0.474	0.651
SYNCH	13,936	-0.726	0.878	-2.331	-1.255	-0.665	-0.104	0.625
Panel B: Financial Experience measures (independent variables)								
Frac. of Acc. Fin. Exp. Dir.	13,936	0.290	0.179	0.000	0.143	0.273	0.400	0.625
Frac. of Non-Acc. Fin. Exp. Dir.	13,936	0.127	0.120	0.000	0.000	0.111	0.200	0.364
Panel C: firm financial information (control variables)								
SIZE	13,936	7.845	1.582	5.529	6.684	7.657	8.915	10.733
LEV	13,936	0.214	0.168	0.000	0.058	0.209	0.328	0.508
M/B	13,936	3.481	3.579	0.929	1.597	2.436	3.904	9.279
VOLUME	13,936	0.201	0.139	0.057	0.107	0.162	0.251	0.488
SDRET	13,936	0.024	0.011	0.011	0.016	0.022	0.029	0.047
Log(NIND)	13,936	4.676	0.913	2.918	4.094	4.660	5.252	6.058

Table 3. 5 Univariate analysis

This table presents the study univariate analysis. Firm-year observation are divided into two groups based on the sample median Frac. of Acc. Fin. Exp. Dir. T-test (Wilcoxon signed-rank test) were used to determine whether the difference in means (medians) is statistically significant. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	High Frac. of Acc. Fin. Exp. Dir.=1 (6,686 obs.)		Low Frac. of Acc. Fin. Exp. Dir.=0 (7,250 obs.)		Difference(1-0)	
	Mean	Median	Mean	Median	Mean	Median
SYNCH	-0.628	-0.577	-0.816	-0.755	0.188***	0.178***
R^2	0.370	0.360	0.334	0.320	0.036***	0.040***
SIZE	8.049	7.844	7.658	7.475	0.391***	0.370***
M/B	3.710	2.523	3.270	2.360	0.440***	0.163***
VOLUME	0.209	0.170	0.195	0.154	0.014***	0.015***
SDRET	0.023	0.020	0.026	0.023	-0.003***	-0.003***
Log(NIND)	4.591	4.599	4.755	4.739	-0.164***	-0.140***
LEV	0.232	0.229	0.196	0.188	0.036***	0.042***

Table 3. 6 Correlation matrix

This table presents the study variables correlation matrix. Spearman (Pearson) correlation coefficients are shown on below (above) the diagonal. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6	7	8	9	10
R^2	1.000	0.9796***	0.1160***	0.0201**	0.2277***	-0.0612***	-0.0476***	-0.0980***	0.0277***	0.0862***
SYNCH	1.000***	1.0000	0.1181***	0.0267***	0.2280***	-0.0592***	-0.0632***	-0.0969***	0.0330***	0.0826***
Frac. of Acc. Fin. Exp. Dir.	0.124***	0.1242***	1.0000	0.1917***	0.1595***	0.0603***	-0.1819***	-0.1169***	0.0457***	0.1384***
Frac. of Non-Acc. Fin. Exp. Dir.	0.028***	0.0282***	0.2223***	1.0000	0.0148*	0.0235***	-0.0814***	-0.0594***	0.0254***	0.0293***
SIZE	0.235***	0.2354***	0.1552***	0.0205*	1.0000	0.2468***	-0.4301***	-0.0169**	0.0006	0.1736***
M/B	-0.073***	-0.0734***	0.0376***	0.0234***	0.3406***	1.0000	-0.0658***	0.0596***	0.0398***	0.1091***
SDRET	-0.0834***	-0.0834***	-0.1925***	-0.0956***	-0.4816***	-0.1773*	1.0000	0.1438***	0.4107***	-0.1027***
Log(NIND)	-0.1014***	-0.1014***	-0.1171***	-0.0754***	-0.012	0.1076***	0.1526***	1.0000	0.0441***	-0.2233***
VOLUME	0.0566***	0.0566***	0.1028***	0.0376***	0.0847***	0.0209	0.3777***	0.0448***	1.0000	-0.0173**
LEV	0.1003***	0.1003***	0.1283***	0.0383***	0.2215***	-0.0779***	-0.1714***	-0.2486***	-0.0297***	1.0000

3.6. Regression results

To test the study's main hypothesis, the study estimates Eq. (5) using pooled ordinary least squares (OLS) regression with firm and year fixed effect. All continued variables were winsorised by 1%. Table 3.7 presents the study main results on the relationship between financial-experts on board and firm stock price synchronicity. The table first column presents the results for the baseline model, where stock price synchronicity is regressed against the fraction of accounting financial experience and firm size. The results show a negative coefficient of the *Frac. of Acc. Fin. Exp. Dir*. and statistically significant at less than 5% threshold, which implies a negative relationship between the fraction of accounting financial-expert directors and firm stock price synchronicity. This indicates that results are inconsistent with the correlation evidence where the *Frac. of Acc. Fin. Exp. Dir*. shows a positive effect on firm *SYNCH*. However, the results are consistent with the study main hypothesis estimating that the fraction of accounting financial-experts is negatively related to firm stock price synchronicity. This result implies that directors with previous accounting financial-experience encourage the flow of firm-specific information into the share price. Thus, share price would reflect on more firm-specific information and less industry- and market- information which reflects on low stock price synchronicity.

Table 3.7 (second column) shows the study expands on the baseline model with firm's and industry's control variables verified by literature to affect stock price synchronicity (e.g. Piotroski and Roulstone (2004); Hutton et al. (2009); Boubaker et al. (2014)). Compared to the baseline model, after adding all control variables, the *Frac. of Acc. Fin. Exp. Dir.* remains negatively and significantly (at less than 5% threshold) to stock price synchronicity. The model R-squares slightly improved after adding control variables (from 0.439 to 0.442) which suggests a slightly better fit model. As stated in previous literature, *SIZE* shows a positive and significant (at less than 1% threshold relationship) to stock price synchronicity. This is in line with Roll (1988) conclusion that large firms incorporate more industry- and market- information than firm-specific information, when compared to small firms. The second column also shows that the coefficient of *LEV* to be positive and significant at less than 5% level. This suggests that levered firms incorporate more industry- and market-wide information than firm-specific information, similar to Rajgopal and Venkatachalam

(2011) findings. In the model, firms' *SDRET* ration appears to be positively related to stock price synchronicity at 1% significance level. This came in line with Bhushan (1989) argument that firms with high return volatility, the probability of the expected return provisional on private and public information highly deviates from the expected return provisional solely on public information, and is thus required to generate more firm-specific information. Moreover, as Chan and Hameed (2006) point out, a firm with high volatility return has a richer information environment. Therefore, their share price will be more independent from market and industry effect. The firms' *VOLUME* in the sample is found to be negatively and strongly related to stock price synchronicity (at 1% significance level). This result is similar to Easley et al. (1996) argument that firms with a high trading volume have a higher probability of information events than those of low volume trading. Additionally, Alford and Berger (1999) state that higher trading volume results in security analysis being more incentive to supply more information. Therefore, higher trading volume firms incorporate more firm-specific information and less industry- and market-wide information reducing firm stock price synchronicity. The *M/B* and *Log(NIND)* are found to be insignificant to stock price synchronicity at all conversational level in all models. For all models, all control variables remain with the same magnetite and significance level.

Table 3.7 column 3 and 4, the study replicates regressions in columns 1 and 2, respectively, but uses different financial experience measures. Column 3 employs directors' financial experience using directors' non-accounting financial-experts (directors with previous firm CEO or Present experience). The *Frac. of Non-Acc. Fin. Exp. Dir*. appears to have an insignificant relationship to stock price synchronicity. After controlling for firm and industry control variables, column 4 shows the *Frac. of Non-Acc. Fin. Exp. Dir.* remains insignificant to *SYNCH*. This is in line with the study main hypothesis, suggesting that, unlike directors with accounting financial-experience, directors with non-accounting financial-experience do not affect the amount of information imbedded into the share price.

Table 3. 7 Financial experience and stock price synchronicity

This table reports the results of OLS regressions of the relation between financial-experts and stock price informativeness. The dependent variable is the stock price synchronicity (*SYNCH*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). Other firm-level independent variables include: The logarithm of the market capitalisation at the end of the year (*SIZE*), market-to-book ratio (*M/B*), standard deviation of their daily return over the fiscal year (*SDRET*), the logarithm of the number of firms in the industry to which the firm belongs (*Log(NIND)*), share traded volume (*VOLUME*) and firm leverage (*LEV*). The study control for firm and year fix effect. Standard errors (in brackets) are clustered at the firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Expected signs	*SYNCH*			
		(1)	(2)	(3)	(4)
Frac. Of Acc. Fin. Exp. Dir.		-0.185**	-0.196**		
		(0.0848)	(0.0852)		
Frac. Of Non-Acc. Fin. Exp. Dir.				0.116	0.127
				(0.110)	(0.111)
SIZE	(+)	0.119***	0.151***	0.122***	0.155***
		(0.0173)	(0.0192)	(0.0173)	(0.0191)
M/B	(-)		0.000204		-0.000252
			(0.00297)		(0.00298)
SDRET	(-)		8.002***		8.012***
			(1.414)		(1.414)
Log(NIND)	(?)		0.0407		0.0346
			(0.0699)		(0.0697)
VOLUME	(-)		-0.234**		-0.238**
			(0.0931)		(0.0931)
LEV	(+/-)		0.169**		0.170**
			(0.0859)		(0.0857)
Year FE		Yes	Yes	Yes	Yes
Firm FE		Yes	Yes	Yes	Yes
Observations		13,936	13,936	13,936	13,936
R-squared		0.439	0.442	0.439	0.442

All in all, the results appear to be qualitatively different for director accounting financial experience compared to directors' non-accounting financial experience. Unlike the fraction of directors with non-accounting financial experience, the regression results show that the fraction of directors with accounting financial experience improves firm-specific information in the market, which results in more firm-specific information embedded in share price, reducing firm stock price synchronicity. These results compose new evidence in the literature.

3.7. Robustness checks

In order to assess the reliability of the results, multiple sensitivity tests performed. First, this part of the study controls for board attributes that might affect firm information environment — board independence and board size. Board independence was reported in the literature to have a positive effect on firm information environment (Beny 2005; Huafang and Jianguo 2007; Chau and Gray 2010; Sun et al. 2012). Moreover, large boards were also found in the literature to improve firm information environment (Arcay and Vazquez 2005; Chahine and Filatotchev 2008; Akhtaruddin et al. 2009; Abeysekera 2010). After controlling for board independence and size, all regression results remain the same (see Table 3.8 columns 1 and 2).

Second, a replication of the study's primary regressions also undertaken use more stringent sample. For firms to be included in the second robustness regression, firms must have a minimum of 50 weeks of observations per year instead of 30 weeks of observations; the results remain qualitatively the same (see Table 3.8 columns 3 and 4). Third, the largest 40 firms from the sample are excluded since market index was calculated based on firm market capitalisation, the relationship between a firms' return and market return could be driven by the existence of large firms in the market. although the fraction of large firms' present effect was mitigated by the large sample size, repeating the regression after excluding the top 40 firms, the results remain the same. Fourth, to avoid any bias result driven from the unusual stock price behaviour of this year financial depression, the study excludes the year 2007 from the sample. The conclusion of all variables remains the same (see Table 3.8 columns 5 and 6).

In conclusion, the findings presented in this chapter are robust to alternative regression specification. The relationship between the fraction of directors with financial experience on board and firm stock price synchronicity is also robust to other board attributes, more stringent sample (minimum of 50 weeks of observations per year instead of 30), the presence of top firms in the sample and the present unusual stock price behaviour due to the financial crisis

Table 3. 8 Financial experience and stock price synchronicity (Robustness checks)

This table reports the results of OLS regressions of the relation between financial-experts and stock price synchronicity robustness checks. The dependent variable is the stock price synchronicity (*SYNCH*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.)* and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). Other firm-level independent variables include: The logarithm of the market capitalisation at the end of the year (*FirmSize*), market-to-book ratio (MB), standard deviation of their daily return over the fiscal year (*SDRET*), the logarithm of the number of firms in the industry to which the firm belongs (*Log(NINA)*), share traded volume (*VOLUME*) and firm leverage (*LEV*). the first two columns the board independence (*Indep*) and the total number of directors on board (*BoardSize*) are added. the third and fourth columns restrict the sample to minimum of 50 weeks of stock price observation to calculate stock price synchronicity. the fifth and sixth columns, the top 40 firms based on their market capitalisation were removed from the sample. The seventh and eighth columns the year 2007 the study removed from the sample. The study control for firm and year fix effect. Standard errors (in brackets) are clustered at the firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Adding board attributes		Min 50 weeks obs.		Removing the top 40 firms		Removing year 2007	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Frac. of Acc. Fin. Exp. Dir.	-0.206**		-0.247***		-0.205**		-0.193**	
	(0.0863)		(0.0937)		(0.0877)		(0.0868)	
Frac. of Non-Acc. Fin. Exp. Dir.		0.126		0.262**		0.114		0.121
		(0.111)		(0.119)		(0.115)		(0.113)
SIZE	0.152***	0.155***	0.166***	0.171***	0.152***	0.156***	0.156***	0.160***
	(0.0192)	(0.0192)	(0.0197)	(0.0197)	(0.0195)	(0.0195)	(0.0197)	(0.0196)
M/B	9.06e-07	-0.000380	-0.00117	-0.00163	-0.000312	-0.000703	-0.000482	-0.000967
	(0.00300)	(0.00301)	(0.00305)	(0.00307)	(0.00313)	(0.00314)	(0.00309)	(0.00309)
SDRET	8.124***	8.130***	6.920***	6.930***	7.525***	7.541***	7.808***	7.818***
	(1.413)	(1.414)	(1.510)	(1.515)	(1.435)	(1.435)	(1.436)	(1.436)
Log(NIND)	0.0451	0.0388	-0.00115	-0.00945	-0.0139	-0.0192	0.0388	0.0328
	(0.0698)	(0.0696)	(0.0731)	(0.0728)	(0.0728)	(0.0726)	(0.0711)	(0.0710)
VOLUME	-0.245***	-0.248***	-0.252**	-0.257**	-0.216**	-0.223**	-0.171*	-0.176*
	(0.0938)	(0.0938)	(0.103)	(0.103)	(0.0942)	(0.0943)	(0.0950)	(0.0950)
LEV	0.172**	0.170**	0.229**	0.229**	0.180**	0.181**	0.192**	0.192**

	(0.0861)	(0.0860)	(0.0931)	(0.0927)	(0.0875)	(0.0874)	(0.0868)	(0.0866)
Indep	0.169*	0.152						
	(0.0992)	(0.0989)						
BoardSize	-0.000288	0.00166						
	(0.00647)	(0.00646)						
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,908	13,908	11,683	11,683	13,320	13,320	13,058	13,058
R-squared	0.442	0.442	0.468	0.467	0.441	0.441	0.451	0.450

3.8. Addressing endogeneity issues.

A potential concern is that board composition is endogenous with respect to stock price informativeness. For example, results may be driven by omitted variables, a variable that affects both, stock price synchronicity and the fraction of financial-expert directors on board. Moreover, the study results might be subject to reverse causality. That is, firms with superior information environment may be regarded more appealing and able to recruit more qualified directors with financial experience.

To address these concerns, the study adopts an alternative research design, a quasi-natural experiment, which offers a research design that is less susceptible to endogeneity and is thus more likely to show a causal effect. The difference-in-difference (DID) approach was chosen to eliminate the observed or unobserved difference in the stock price synchronicity and the fraction of financial-experts on board relationship over time. The study exploits the reasonably exogenous increase in the fraction of financial-expert directors on boards brought by the 2003 NYSE and NASDAQ listing rules, instructing boards without majority independence to hire new independent directors. Since boards without financial-expert directors prior to the Act are more likely to appoint new financial directors as a result of the new appointment of new independent directors.

Since the validity of the approach depends on the parallel trend assumption: in the absence of the SOX Act, treated firms' financial-experts would have evolved in the same way as the control firms. Specifically, the parallel trends assumption does not require the level of stock price synchronicity variables to be identical across the treatment and control groups in the pre-treatment period, yet it requires a similar movement in financial-experts' variables (Gao and Zhang). Following Hong and Kacperczyk (2010) and Dasgupta et al. (2010) the study estimates the following regression:

$$\Delta SYCH_{i,t} = \beta_0 + \beta_1 Treat_i * Year_{2001,i} + \beta_2 Treat_i * Year_{0204,i} + \beta_3 Treat_i * Year_{0506,i} + \beta_6 Treat_i + \gamma Controls + firmFE + YearFE + \varepsilon_{i,t} \quad (6)$$

Where $\Delta SYCH_{i,t} = SYCH_{i,t} - SYCH_{i,t-1}$ for firm i and year t; $Treat$ is a dummy variable that equals one for firms without any financial-expert directors on the

board, and zero otherwise. $Year_{2000}$ is the baseline year. $\gamma\, Controls$ are the firms control variables. The study also adds the firm and year fix effect to the model ($firmFE\ and\ YearFE$ respectively). The study uses sample size between 2000 and 2006. For firms to be included in the sample, they need to appear at least in year 2000 as it was the baseline year.

Table 3. 9 Pre-treatment trend

This table shows the pre-treatment trend between the treated group and the control group. The dependent variable is the change in firm stock price synchronicity (Δ*SYNCH*). The indicator variable *Treat* is a dummy variable that takes the value of 1 if the firm has zero financial-experts on the baseline year 2000 and 0 otherwise. The dummy variables $Year_{2001}$, $Year_{0204}$, and $Year_{0506}$ equal one for the years 2001, 2002-2004, and 2005-2006, respectively, and zero otherwise. Other firm-level control variables include: The logarithm of the market capitalisation at the end of the year (*SIZE*), market-to-book ratio (M/B) , standard deviation of their daily return over the fiscal year (*SDRET*), the logarithm of the number of firms in the industry to which the firm belongs (Log(NIND)), share traded volume (VOLUME) and firm leverage (*LEV*). The study control for firm and year fix effect. Standard errors (in brackets) are clustered at the firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Δ*SYNCH*
	(1)
Treat × *Year* $_{2001}$	-0.514
	(0.360)
Treat × *Year* $_{0204}$	-0.580*
	(0.349)
Treat × *Year* $_{0506}$	-0.548
	(0.350)
SIZE	0.382***
	(0.0637)
M/B	0.00806
	(0.0133)
SDRET	6.688
	(4.373)
Log(NIND)	0.199
	(0.211)
VOLUME	-0.528
	(0.367)
LEV	0.198
	(0.296)
Year FE	Yes
Industry FE	Yes
Observations	2,691
R-squared	0.214

As Table 3.9 shows, the coefficient estimate for $Treat_i * Year_{2001}$is statistically insignificant, suggesting that the pretrend in the change in stock price synchronicity is not significantly different between firms with and without financial-expert directors prior to the SOX Act. The impact of SOX Act starts to show after its

enactment in the period between 2002 and 2004 ($Treat_i * Year_{0204}$) showing significantly negative magnitude at 10% level. However, the effect disappears at the period following to the implementation of SOX Act $Treat \times Year_{0506}$. This could be due to the period prior and beginning to the 2006 financial crisis resulting in the unusual stock price behavior of these years' financial distress.

Table 3.9 shows that prior to the implementation of the SOX Act, financial-experts of treatment and controlled groups trend were similar. This is associated with the DID parallel trends assumption. Additionally, results denote that the effect of SOX Act starts after its enactment in 2002-2004 period and dissolves after that, implying a causal effect.

3.9. Additional analysis

This study also takes the opportunity to undertake further analysis to allow a better understanding of the effect of directors' financial experience on the stock price synchronicity dynamic by analysing the impact of financial experts on crash risk, the effect of directors characteristics on the relationship between the fraction of financial-experts on board and stock price informativeness and the cross sectional variation on the study main results.

3.9.1. Crash risk

As documented in prior literature, directors' financial experience affects the directors' ability to monitor CEOs (Harris and Raviv 2008) and thus improve the board monitor (Xie et al. 2003; Abbott et al. 2004; Agrawal and Chadha 2005). According to Kothari et al. (2009), managers tend to delay the disclosure of bad news to investors in the presence of a conflict of interest between managers and shareholders. Nevertheless, Jin and Myers (2006) establish that no bad news can be withheld forever. Instead, it can only be held to a certain point where all bad news is suddenly released. This sudden shock in the market results in a dramatic decrease in share prices, defined as the firm crash risk. At the country level, Jin and Myers (2006) demonstrate that, in more transparent countries, firms experience less stock crash risk compared to low, transparent countries.

To measure crash risk, the study used two different measures that are in line with previous literature studying crash risk. As the study focuses on firm-specific factors that donate firm specific-crash risk, the study first measures the firm-specific weekly retune signified by W. W is measured by the natural logarithm of one plus the residual return for the following equation. That is $W_{i,t} = In(1 + \varepsilon_{i,t})$:

$$R_{i,W} = \alpha + \beta_1 MR_{w,t-2} + \beta_1 MR_{w,t-1} + \beta_1 MR_{w,t} + \beta_1 MR_{w,t+1} + \beta_1 MR_{w,t+2} + \varepsilon_{i,t} \quad (7)$$

Following Chen et al. (2001) and Kim et al. (2011b), the first measure of crash risk is by identifying the negative conditional return skewness (*NCSKEW*). That is, for a giving firm-year, the *NCSKEW* is obtained by taking the negative of the third moment of firm-specific weekly returns for each sample year and dividing it by the standard deviation of firm-specific weekly returns raised to the third power. Precisely, for each firm i in year t the *NCSKEW* is calculated as:

$$NCSKEW_{i,t} = -[n(n-1)^{\frac{3}{2}} \Sigma W_{i,t}^3]/[(n-1)(n-2)(\Sigma W_{i,t}^2)^{\frac{3}{2}}] \quad (8)$$

The second crash risk measures the study using the down-to-up volatility (*DUVOL*) drone from Chen et al. (2001). For each firm-year, *DUVOL* is measured by separating all "down" weeks (weeks with firm-specific weekly returns lower the annual mean) from "up" weeks (weeks with firm-specific weekly returns higher the annual mean) and separately computes the standard deviation of the "up" and "down" weeks and the *DUVOL* is the natural logarithm of the standard deviation of the "down" weeks divided by the standard deviation of the "up" weeks.

The following model is used to estimate the relationship between directors' financial experience and stock price crash risk:

$$CrashRisk_{i.t} = \beta_0 + \beta_1 \, Financial \, experiance_{i,t} + \gamma \, Controls_{i,t} + (Year \, Dummies) + (IndustryDummies) + \varepsilon_{i,t} \quad (9)$$

Where $CrashRisk$ represents variables used to measure stock price crash risk, more specifically *NCSKEW* and *DUVOL*. $Controls$ is the regression control variables. The study control for firm size, leverage, market-to-book ratio, standard deviation of their return and the number of industry firms in which the firm belongs. Furthermore, the regression controls for the industry and year fixed effects.

Table 3. 10 Financial experience and crash risk

This table reports the results of OLS regressions of the relation between financial-experts and Crash risk. The dependent variables are the negative conditional return skewness (*NCSKEW*) and the don-to-up volatility (*DUVOL*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). Other firm-level independent variables include: The logarithm of the market capitalisation at the end of the year (*SIZE*), market-to-book ratio (*M/B*), standard deviation of their daily return over the fiscal year (*SDRET*), the logarithm of the number of firms in the industry to which the firm belongs (*Log(NIND)*), share traded volume (*VOLUM*) and firm leverage (*Lev*). The study controls for firm and year fix effect. Standard errors (in brackets) are clustered at the firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	NCSKEW		*DUVOL*	
	(1)	(2)	(3)	(4)
Frac. of Acc. Fin. Exp. Dir.	-0.106		-0.0318	
	(0.0814)		(0.0267)	
Frac. of Non-Acc. Fin. Exp. Dir.		-0.0816		-0.000951
		(0.112)		(0.0361)
SIZE	-0.0690***	-0.0676***	-0.0179***	-0.0174***
	(0.0174)	(0.0174)	(0.00548)	(0.00549)
M/B	-0.0226***	-0.0230***	-0.00767***	-0.00775***
	(0.00298)	(0.00299)	(0.00104)	(0.00104)
SDRET	-0.469	-0.493	0.102	0.0986
	(1.279)	(1.280)	(0.417)	(0.417)
Log(NIND)	0.0824	0.0806	0.0127	0.0119
	(0.0637)	(0.0636)	(0.0212)	(0.0212)
VOLUM	0.832***	0.828***	0.289***	0.288***
	(0.0911)	(0.0912)	(0.0313)	(0.0313)
LEV	0.166*	0.167*	0.0517*	0.0518*
	(0.0884)	(0.0883)	(0.0283)	(0.0283)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	13,785	13,785	13,785	13,785
R-squared	0.104	0.104	0.107	0.106

Table 3.10 reports the regression results of Eq. 9. It shows the relationship between directors' financial expertise and firm crash risk. Columns 1 and 2 test the relationship between the fraction of financial-expert directors and firm crash risk measured by *NCSKEW*. Column 1 shows that when measuring directors' financial experience by directory accounting financial experience, the coefficient shows a negative magnitude to firm *NCSKEW*. That is the fraction of financial-experts on

board reduces firm crash risk. However, the relationship appears to be insignificant at any level. Column 2 replicates column 1 regression using the fraction of non-accounting financial-experts and shows similar results, a negative but insignificant relationship between *Frac. of Non-Acc. Fin. Exp. Dir*. and *NCSKEW*.

Table 3.10 Columns 3 and 4 imitate the table first two columns regression using the *DUVOL* crash risk measure. When changing crash risk measure, the first two columns' result remains the same, the *Frac. of Acc. Fin. Exp. Dir.* and the *Frac. of Non-Acc. Fin. Exp. Dir.* have a negative but insignificant relationship to firm crash risk measured by *DUVOL*. These results indicate that the fraction of accounting financial-experts and the fraction of non-accounting financial-experts have no significant effect on firm crash risk.

All in all, the results show that although the *Frac. of Acc. Fin. Exp. Dir.* reduce firm stock price synchronicity, increasing the firm-specific information embedded in the share price; it failed to have an effect on CEOs' ability to withhold bad news disclosure resulting in crash risk. A similar result is also found when directors' financial experience is measured by the *Frac. of Non-Acc. Fin. Exp. Dir.*

3.9.2. Effect of directors' characteristics.

In this section, to understand the dynamics of the effect of accounting financial-expert directors' effect on firm stock price synchronicity by empirically testing whether the relationship between the fraction of directors' financial experience and stock price synchronicity is diverse across different types of directors' characteristics[12]. Through the literature, directors' characteristics effect on directors' monitoring drew many scholars' attention. This study split the fraction of accounting financial-experts based on directors' business (*Frac. of Acc. Fin. Exp. Dir.(Busy)* and Frac. of *Acc. Fin. Exp. Dir. (Non-Busy)*), independence (*Frac. of Acc. Fin. Exp. Dir. (Independent)*) and *Frac. of Acc. Fin. Exp. Dir. (Executive)*) and gender (*Frac. of Acc. Fin. Exp. Dir. (Female)*

[12] The study draws its further analysis based on directors' accounting financial experience only giving their significant relationship to firm stock price synchronicity. The study investigated a similar analysis on non-accounting financial-experts and found the non-significant relationship does not change with different directors' characteristics. However, these results are not documented in this study.

and *Frac. of Acc. Fin. Exp. Dir. (Male)*) and tests their effect on firm stock price synchronicity.

Table 3.11 presents the results of the regressions of stock price synchronicity for different groups of the *Frac. Of Acc. Fin. Exp. Dir.* Column 1 presents the results for busy and non-busy *Frac. Of Acc. Fin. Exp. Dir.* A business of director is identified if the director serves on three or more current boards. The split was based on the sample median on the number of seats a director holds on other current boards. Column 1 documents a negative relationship between both *Frac. Of Acc. Fin. Exp. Dir. (Busy)* and *Frac. Of Acc. Fin. Exp. Dir. (Non-Busy)* with *SYNCH*. However, the relationship is only significant with *Frac. Of Acc. Fin. Exp. Dir. (Busy)*. This concludes that the relationship between accounting financial-expert directors on board and the amount of information embedded into the share price is driven from busy accounting financial-experts. This is in line with the literature findings that busy directors are better source of knowledge (Harris and Shimizu, 2004) and that director busyness is a proxy for director quality (Ghosh, 2007) as they may provide better expertise by gaining experience with other board responsibilities and be better monitors (Ferris et al., 2003).

Column 2 in Table 3.11 test the relationship between the *Frac. Of Acc. Fin. Exp. Dir.* independence on firm stock price synchronicity. The results show a negative and significant coefficient only for the *Frac. Of Acc. Fin. Exp. Dir. (Independent)* and not for *Frac. Of Acc. Fin. Exp. Dir. (Executive)*. This result indicates that the fraction of accounting-financial-experts are more effective in reducing firm stock price synchronicity if they are independent. This finding is consistent with the literature that independent directors improve the firm monitoring and informational environment (Chen and Jaggi 2000; Lim et al. 2007; Donnelly and Mulcahy 2008; Garcia-Meca and Sanchez-Ballesta 2010).

Table 3. 11 Board of directors' characteristics and stock price synchronicity

This table reports the results of OLS regressions of the relation between different directors' characteristics financial experience and stock price synchronicity. The dependent variable is the stock price synchronicity (*SYNCH*). The main independent variables are the percentage of busy accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.(Busy)*), the percentage of non-busy accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir. (Non-Busy)*) the percentage of independent accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir. (Independent)*), the percentage of executive accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir. (Executive)*), the percentage of female accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir. (Female)*) and the percentage of male accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir. (Male)*). Other firm-level independent variables include: The logarithm of the market capitalisation at the end of the year (*SIZE*), market-to-book ratio (*M/B*), standard deviation of their daily return over the fiscal year (*SDRET*), the logarithm of the number of firms in the industry to which the firm belongs (*Log(NINA)*), share traded volume (*VOLUME*) and firm leverage (*LEV*). The study control for firm and year fix effect. Standard errors (in brackets) are clustered at the firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	SYNCH		
	(1)	(2)	(3)
Frac. of Acc. Fin. Exp. Dir.(Busy)	-0.0982**		
	-0.0398		
Frac. of Acc. Fin. Exp. Dir. (Non-Busy)	-0.0447		
	-0.0517		
Frac. of Acc. Fin. Exp. Dir. (Independent)		-0.178**	
		-0.0701	
Frac. of Acc. Fin. Exp. Dir. (Executive)		0.0354	
		-0.0372	
Frac. of Acc. Fin. Exp. Dir. (Female)			-0.0166
			-0.0345
Frac. of Acc. Fin. Exp. Dir. (Male)			-0.136*
			-0.0776
SIZE	0.152***	0.151***	0.152***
	-0.0191	-0.0191	-0.0192
M/B	0.00016	0.0000554	0.0000486
	-0.00297	-0.00296	-0.00297
SDRET	7.997***	8.000***	8.023***
	-1.408	-1.41	-1.41
Log(NIND)	0.0387	0.04	0.0391
	-0.0697	-0.0698	-0.0698
VOLUME	-0.239**	-0.236**	-0.235**
	-0.0928	-0.0929	-0.0931
LEV	0.171**	0.168*	0.170**
	-0.0857	-0.0857	-0.0859
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Observations	13,908	13,908	13,908
R-squared	0.442	0.442	0.442

Column 3 in Table 3.11 presents the regression result for the relationship between firm stock price synchronicity and the *Frac. Of Acc. Fin. Exp. Dir.* split based on accounting financial-experts' gender. It concludes that despite *Frac. Of Acc. Fin. Exp. Dir.(Female)* and *Frac. Of Acc. Fin. Exp. Dir. (Male)* both have a negative coefficient, only *Frac. Of Acc. Fin. Exp. Dir. (Male)* is significant. This indicates that the fraction of male accounting financial-experts to males on board have a positive effect on the amount of information imbedded in the share price where the fraction of female accounting financial-experts to females on board has no significant effect. Although Gul et al. (2011) found that female directors improve stock price informativeness, when looking at the fraction of accounting financial experience, the study found that the fraction of male accounting financial-experts to male directors improves stock price informativeness rather than the fraction of female accounting financial-experts to female directors.

All in all, for different directors' characteristics, the percentage of accounting financial-experts' effect on stock price synchronicity differs. According to the study findings, increasing the percentage of accounting-financial-experts with busy, independent and male directors can improve the amount of information embedded in the share price.

3.9.3. Cross-sectional variation in financial-experts' synchronicity.

In this section, the study turns attention to whether a relationship between the financial-experts on board and stock price informativeness is heterogeneous across different types of firms. The study examines how firm size, the quality of a firm's corporate governance and market competition affects the financial-experts stock price informativeness relation. Firms are grouped according to the median of the distribution of corporate governance variables. However, for CEO duality variable, the sample is grouped according to the CEO duality condition.

Table 3.12 presents regressions of firm *SYNCH* for groups of firms based on their size, internal and external corporate governance quality and market competition. In the literature, firm size has indicated to be a key determinant of stock price synchronicity (Roll 1988; Skaife et al. 2006). Columns 1 and 2 present the regressions results of the effect of accounting financial-experts on firm stock price synchronicity

based on the sample split of small and large firms (measured as the logarithm of the firm market capitalisation at the end of the year). Columns 1 and 2 found a negative relationship between *SYNCH* and *Frac. of Acc. Fin. Exp. Dir.*. However, the negative coefficient for *Frac. of Acc. Fin. Exp. Dir.* was only found in large firms. This suggest that the study's prime findings are exclusively driven by large firms.

According to previous studies, board independence is linked to better corporate governance and board monitoring (Weisbach 1988). Columns 3 and 4 present the regression results between *SYNCH* and *Frac. of Acc. Fin. Exp. Dir.* for the sample splits of high and low dependent boards' firms. For high board independence firms, column 3 shows that the *Frac. of Acc. Fin. Exp. Dir.* coefficient is negative and significant at 10% level. However, for low board independence firms, column 4 shows that the *Frac. of Acc. Fin. Exp. Dir.* to be insignificant at any level. These results conclude that the negative relationship between *SYNCH* and Frac. of *Acc. Fin. Exp. Dir.* only exists in high dependent board firms. This indicates that the study prime findings are exclusively driven by high dependent boards' firms.

Focusing on extant literature on corporate governance quality, CEO duality is a widely studied topic and the results on CEO duality on firms' reveal mixed results. From stewardship theory point of view, CEO duality is a necessary contributor to the harmony of the firm (Donaldson and Davis 1991) where agency theory proponents perspective argues that firms with a management structure based on non-CEO duality delivers better governance through more CEO monitoring effectiveness (Peng et al. 2007). Columns 5 and 6 present the results for the relationship between *SYNCH* and *Frac. Of Acc. Fin. Exp. Dir.* for the sample split based on CEO duality. A negative relationship is found between *SYNCH* and *Frac. Of Acc. Fin. Exp. Dir.* only in firms where supervision structure is based on CEO duality. This concludes that the fraction of accounting financial-experts on board is effective on increasing the amount of information embedded in the share price if CEO duality exists.

The empirical findings on the institutional ownership effectiveness over top management monitoring are also mixed. whilst some studies provide empirical evidence suggesting that institutional investors serve a monitoring role (Chung et al. 2002; Hartzell and Starks 2003), other studies contradict this finding (Brickley et al. 1988; Van Nuys 1993). Columns 7 and 8 show the regression results between *SYNCH*

and *Frac. Of Acc. Fin. Exp. Dir.* for the sample split based on the firm institutional ownership. Results show that the negative relationship between *Frac. Of Acc. Fin. Exp. Dir.* and *SYNCH* are significant only in low institutional ownership sample. The study concludes that main findings are fully driven by low institutional ownership firms.

The study also used the E-Index of Bebchuk et al. (2009) as a measure of corporate governance strength[13]. High E-Index indicates low corporate governance strength where low E-Index indicates high corporate governance strength. Columns 9 and 10 illustrate the main study regression on the sample split based on the E-Index score. The study concludes that after splitting the sample, results show that the primary study results hold only on firms with weak corporate governance.

Lastly, the study considers firm market competition. Each firm's HHI (Herndahl-Hirschman Index) was measured based on the "Textual Network Industry Classification" (TNIC) industries formed using firm-by-firm similarity measures following Hoberg et al. (2014). Testing the firm market competition effect on the relationship between *SYNCH* and *Frac. of Acc. Fin. Exp. Dir*., according to Hoberg et al. (2014) in a less stable market, firms hold more security to allow them to react at times when competitive threats arise. Better firm corporate governance will allow firms to better react at market competitive threats (Kurzeja and Novak 2017). Column 11 and 12 shows that the negative association between directors accounting financial experience and firm stock price synchronicity is pronounced in firms with low market competition rather than high market competition.

[13] E-Index is constructed based on the six provisions (staggered boards, limits to shareholder byelaw amendments, supermajority requirements for mergers, supermajority requirements for charter amendments, poison pills, and golden parachute). The study give the value of 1 for the presence of each provision or 0 otherwise. The E-Index is the sum of the values of all the 6 provision. Thus E-Index will take the value from 0 to 6 Bebchuk, L. et al. 2009. What Matters in Corporate Governance? *The Review of Financial Studies* 22(2), pp. 783-827.

Table 3. 12 The effect of firm size and corporate governance

This table reports the results of OLS regressions of the relation between financial-experts and stock price synchronicity. The first columns the sample was divided into high and low firm size. Columns 3 and 4, the sample was divided based on the firm board independence. Columns 5 and 6, the sample was divided based on the firm CEO duality. Columns 7 and 8, the sample was divided based on the firm institutional ownership. Column 9 and 10, the sample was divided based on the firm E-Index. Columns 11 and 12, the sample was divided based on the firm market competition. The study control for firm and year fix effect. Standard errors (in brackets) are clustered at the firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	High Firm Size	Low Firm Size	High indep	Low indep
	SYNCH	*SYNCH*	*SYNCH*	*SYNCH*
	(1)	(2)	(3)	(4)
Frac. of Acc. Fin. Exp. Dir.	-0.200*	-0.163	-0.215*	-0.134
	(0.120)	(0.128)	(0.114)	(0.143)
Control variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	6,909	6,897	7,506	6,295
R-squared	0.472	0.435	0.475	0.478

	CEO is the Chairman	CEO is not the Chairman	High instown	Low instown
	SYNCH	*SYNCH*	*SYNCH*	*SYNCH*
	(5)	(6)	(7)	(8)
Frac. of Acc. Fin. Exp. Dir.	-0.207*	-0.195	-0.125	-0.259**
	(0.108)	(0.165)	(0.117)	(0.122)
Control variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	9,064	4,722	6,539	7,268
R-squared	0.472	0.465	0.480	0.431

	Low E-Index	High E-Index	High HHI	Low HHI
	SYNCH	*SYNCH*	*SYNCH*	*SYNCH*
	(9)	(10)	(11)	(12)
Frac. of Acc. Fin. Exp. Dir.	-0.0386	-0.273**	-0.135	-0.262**
	(0.147)	(0.123)	(0.122)	(0.122)
Control variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	4,188	5,689	6,872	6,706
R-squared	0.509	0.507	0.510	0.439

In summary, the main results of the study appear to vary based on firm size, corporate governance and market competition. For firm size, results hold only in large firms, rather than small firms. However, for firm corporate governance, results mainly hold for firms where CEOs also held the role of chairman, low institutional ownership and low E-Index. This finding shows that directors' financial experience effect appears when firm corporate governance is weak. This is an interesting finding and is in line with the argument that directors with financial experience act as better monitors as their monitoring effect appears where most needed. Conversely, when measuring firm corporate governance by their board independence, directors' financial experience effect appears when firm board of directors is highly independent (strong governance). Moreover, the negative association between directors' accounting financial experience and firm stock price synchronicity is pronounced in firms with low market competition, rather than high market competition. This result is inconsistent with the argument that better corporate governance enhances firm activities during market competitive threats.

3.10. Conclusion

This study investigates the extent to which financial-experts serving on board of directors' affect firm informational environment and can improve the amount of information embedded in the firm share price reducing firm stock price informativeness. The study argues that better financial experience on board can improve the board's understanding of financial information, reduce the cost in obtaining information relating to complexity of financial transactions and risk taking, demand better corporate and financial information environment and improve board monitoring. This, in turn, increases and improves the firm specific information on the market, allowing greater independence to the firm share price.

Based on a sample of 1,078 non-financial firms from the S&P 1500 database for the period 1999–2016, this part of the study presents several important findings and implications. First, the study provides new evidence that firms with a higher fraction of accounting financial-experts on board have lower firm stock price informativeness. However, results show that financial-experts failed to have an effect on CEOs' ability to withhold bad news disclosure resulting in crash risk. Second, the study finds that the negative association between financial-experts on board and firm

stock price informativeness is stronger with busy and independent directors. This finding is in line with prior literature, arguing that different directors' attributes affect firm informational environment. Third, the study highlights that the relationship between accounting financial-experts and stock price informativeness is non-heterogeneous across different types of firms. The relationship is mainly found in firms with large market capitalisation, CEO duality, low institutional ownership and high E-Index. The results show that prior to the implementation of the SOX Act, financial-experts on board of treatment and controlled groups trend were similar. This is in line with the difference-in-difference parallel trends assumption. Moreover, results denote that the effect of the SOX Act began after its enactment in the 2002-2004 period and dissolved after that implying a causal effect.

Overall, the findings presented in this chapter advance the growing literature on the effectiveness of board composition and the role of financial-experts on board monitoring. The study's main results are robust because the study utilises a greater number of board attributes, a stricter sample selection method, removing the effect of large firms and removing the effect of unusual stock price behaviour during financial crises. In particular, the study findings provide some useful guidance to regulators and board of directors on directors' allocation. The next chapter focusses on the investigation relating to financial-experts and firms cash holding.

Chapter 4: Financial experience and firm cash holding

4.1. Introduction

During economic growth, firm cash holding increases and it is the managers' duty to make strategic decisions about the appropriate way to manage the firm cash reserve, whether to distribute it to shareholders, use it internally, use it for external acquisition or continue holding the extra cash Harford et al. (2008). Over recent years, firms worldwide have shown an extraordinary increase in their cash holding. According to Bates et al. (2009), in the US, the cash to assets ratio for industry firms more than doubled during the period between 1980 and 2006. The concept of building up an enormous cash reserve is also seen in the UK market. Florackis and Sainani (2018) note an increase in the average cash holdings of UK firms from the period between 1999 and 2011. Moreover, Iskandar-Datta and Jia (2012) cross-country analysis shows an increase of cash holding in France, Australia, Canada and Germany for the period between 1991and 2007. Consequently, the topic of the main determinants of firm cash holding became increasingly attractive in literature. The aim of this chapter is to investigate the effect that financial expert directors have on firm cash holding.

From an economic logical-perspective, excess cash holdings benefit firms by limiting their transaction cost and funding their capital investment. This results in reducing firm loss from underinvesting due to shortage in free cash flow (Kim et al. 1998; Opler et al. 1999; Mikkelson and Partch 2003; Ozkan and Ozkan 2004). Moreover, cash holding provides firm access with liquidity (Almeida et al. 2014), mainly during a financial crisis or shortage of access to credit (Campello et al. 2011). However, under the agency theory point of view, where ownership and control are separated, firm corporate governance plays a vital role in the firm's level of excess cash held. The theory suggests that better-governed firms are more keen to distribute free cash to shareholders to limit the appearance of agency problem due to managers' misuse of free cash flow (Jensen 1986; Dittmar and Mahrt-Smith 2003). According to Jensen (1986), firms that tend to hold high free cash flow encounter managers who overinvest in unprofitable investments or engage in activities seeking their benefits at the expense of shareholders. Following Jensen (1986) study, literature shows that cash-rich firms engage in more value distortion activities (Lang et al. 1991; Blanchard

et al. 1994; Harford 1999; Harford et al. 2008). Managers have a strong incentive to hold more free cash flow. Thus corporate governance strength was found to have a direct effect on the amount of excess cash holdings in a firm (Dittmar and Mahrt-Smith 2003).

Extended studies provide sufficient evidence on the relationship between shareholders' right and corporate cash holding (Dittmar and Mahrt-Smith 2003; Lee et al. 2003; Kalcheva and Lins 2007; Al-Najjar 2013) and show that countries with low shareholder protection retain more cash. However, when studying the US market, a country with high shareholder protection, Harford et al. (2008) shows that weak corporate governed structured firms have lower cash reserves. Nevertheless, firms with excess cash and weak shareholder rights were found to increase their capital expenditures and acquisitions and reduce their profitability and valuation. Other studies investigate the effect of firm monitory policy on firm cash holding. Jigao and Zhengfei (2009) study investigate the effect of monitory policy and cash holding in China and found that firm cash holding vary according to the monitory policy tightness. They argue that tighter monitory policy, the firm face higher external financial constraints and thus firms hold on more cash.

Board of directors play a pivotal role in firm monitory policy and board of directors' demography reveals a direct effect on firm cash holding. For example, literature shows that firm cash holding can be determined by directors' independence (Ozkan and Ozkan 2004; Chen 2008; Chen and Chuang 2009) board size (Harford et al. 2008; Al-Najjar and Clark 2017), board leadership structure (Kusnadi 2011) and CEO duality (Boubaker et al. 2015). Previous literature also shows the effect of financial expertise on board has on firm financial decisions (Güner et al. 2008; Minton et al. 2011; Minton et al. 2014). This study investigates, for the first time, how financial-experts on board affect the propensity to stockpile cash. In doing so, the study raises the following questions:

(1) Do financial-expert directors lead managers to reduce their stockpile cash reserves?

(2) How does the presence of financial-experts on board affect the managers' deployment of free cash?

(3) Are the differences in deployment of cash reflected in differences in firm profitability and ultimate valuation?

A primary attribute of the study is attempting to capture the different financial-expert director's (accounting financial-experience and non-accounting financial experience) ability to influence critical financial policies in light of two contradicting hypotheses: the flexibility hypothesis and the spending hypothesis. The flexibility hypothesis argues that the less effective control is over managers, the more managers stack cash reserves for future financial flexibility, whereas the spending hypothesis suggests that managers prefer excess cash spending rather than holding, thus the more effective monitoring is over managers. Consequently, better effective control over managers positively affects firm cash holding.

Using a sample of 965 non-finance and non-utility listed firms on the S&P 1500 from 2000 to 2017, this study examines the effect of the fraction of financial-experts on board on firm cash holding and investigates whether these effects are related to firm investment decision and profitability. Using ordinary least squares regression with industry and year fixed effect, this study found that the fraction of accounting financial-experts has an inverse relationship to firm level of cash holding. The relationship was found to be driven by the high fraction of accounting financial-experts decreasing the firm level of cash holding but not by the low fraction of accounting financial-experts on board increasing firm cash holding. The study's main findings are robust to controlling for additional board characteristics and different cash holding measures. To gain a better insight into the dynamics of the relationship between financial-experts on board and firm cash holding, the study investigates the influence of firm financial constraint and corporate governance. Additional tests show that when firm financial constraints are measured by firm size and payout ratio, directors with accounting financial-experience limit firm cash holding in financial constraint firms; however, using KZ Index, the effect of financial-experts on firm cash holding appears only in financially unconstrained firms. Moreover, the fraction of accounting financial-experts is more effective in reducing the firm cash holding when boards are highly independent and small and the firm CEO also holds the role of chairman and the firm E-Index measure is high. This shows that the effect from the

fraction of accounting financial-experts on board on firm cash holding is not consistent across different firms' financial constraint and corporate governance measures.

The study also examines how the relationship between board financial experience and firm excess cash holding affects firm financial decisions and payout policies. Results show that accounting financial-experts' distribution of excess cash usually functions in the form of dividend payments. However, they do not influence how the firm excess cash is used in firm financial decisions. Moreover, results also show accounting financial-experts' ability to enhance firm profitability and market-to-book ratio from the firm changes in excess cash holding. Following Faulkender and Wang (2006) model on the value of cash holding, results suggest that shareholders would not value cash holding any differently in the presence of financial-experts on board. Also, applying Dittmar and Mahrt-Smith (2007) model on the value of excess cash holding, there is no evidence to support the argument that investors would value excess cash holding any differently in the presence of accounting financial-experts on board and very weak evidence on investors valuing excess cash more in the presence of non-accounting financial-experts on board.

The study contributes to the finance literature on the effectiveness of financial-expert directors on board in several ways. First, the results indicate that financial-expert directors play a significant role in firm cash holding and in support of the flexibility hypothesis. This study adds to the literature on the effect of board composition on firm cash holding. Previous literature primarily focuses on the role of board independence, board gender diversity, board size, and CEO duality (Gill and Shah 2012; Boubaker et al. 2015; Atif et al. 2019). To the best of the researcher's knowledge, this study is the first to link financial experience of directors to the firm's cash holding. Second, the results challenge the SOX Act definition of financial experience[14], which includes "supervising" employees with financial reporting responsibilities. Directors with CEO- and Chairman-experiences failed to have the same positive influence to those with prior accounting financial experience. Finally, the results offer empirical justification to increasing calls by policymakers and

[14] This study financial experience measured were taken according to the SOX Act definitions of financial experience (see section 2.2.3.)

academics for more financial-expert directors on boards to prevent managers pursuing self-interest activities.

The remainder of this chapter is organised as follows: Section 4.2 provides a literature review on the firm cash holding; Section 4.3 develops the study hypothesis; Section 4.4 outlines the study sample and the scope; Section 4.5 provides the study methodology; Section 4.6 describes the sample descriptive analysis; Section 4.7 provides and discusses the study main results; Section 4.8 shows additional analysis; Section 4.9 concludes the chapter.

4.2. Hypothesis development

As a corporate governance mechanism, the board of directors is responsible for evaluating and monitoring top management decisions. Fundamental to board effectiveness is the question of directors' characteristics. The literature on the impact of directors' knowledge and experience shows that directors with financial-experts can improve board monitoring and advisory role (Güner et al. 2008; Minton et al. 2011; Minton et al. 2014). Lack of efficient monitoring by the board of director provides managers with more freedom to pursue more self-interested activities, including cash holding (Ozkan and Ozkan 2004; Lee and Lee 2009; Boubaker et al. 2015; Atif et al. 2019).

Previous studies on corporate governance effect on firm cash holding investigate the role of different board characteristics' effect. According to Boubaker et al. (2015) study of French listed firms, firms with more board independence and split CEO and chairman role retain less cash reserve than those of less effective board composition. Gill and Shah (2012) studied the main determinant of firm cash holding in Canada and report, among other firm financial position variables, board size and CEO duality to have a significant effect on firm cash holding. A recent study by Atif et al. (2019), on the effect of gender presence on board on firm cash holding in the US, documents that the more diversified board shows a significant negative relationship to firm level of cash holding. Moreover, Lee and Lee (2009) found that when managerial entrenchment is high, firms' fraction of outside director on the board and smaller board size have a negative effect on firm cash holdings, emphasising that

the positive association between entrenched managers and firm cash holding is mitigated by strong board structure.

Literature on the best board structure to serve shareholder interest recently shed light on the effect of directors' financial experience on firm activities., For example, according to Güner et al. (2008), financial-experts on board play a vital role in firm financial decisions. Other studies show that financial-experts on board are associated with a firm level of risk-taking (Minton et al. 2014). According to Huang et al. (2014), investment bankers on board attempt to increase firm acquisitions. Moreover, they show investment banker directors' ability to identify suitable target acquirers and reduce the cost of acquirers' deals. Harris and Raviv (2008) argue that financial-experts are better able to acquire information about a specific financial transaction complexity and associated risk at a lower cost and are, thus, more effective monitors at top management. Based on financial-experts' ability to make better-informed investment decisions, it can be argued that improving board monitoring through directors' financial experience would affect firm-level and distribution of cash holding. This effect has not been covered in the literature and, therefore, this study investigates the nature and dynamic of the effect of directors with financial experience on board on firm cash holding.

Previous studies discuss financial-expert directors' ability to improve board monitoring role (Xie et al. 2003; Abbott et al. 2004; Agrawal and Chadha 2005). On the one hand, improving monitoring reduces information asymmetry problem between shareholders and managers. Arguably, this would ease borrowing constraints, increasing the firm ability to raise money externally (Ozkan and Ozkan 2004), which suggests a negative relationship between board financial experience and firm cash holding. In contrast, improving board efficiency can provide shareholders with better protection. According to Opler et al. (1999), consistent with the financial hierarchy hypothesis, shareholders would be more willing to ease restrictions on managers, allowing them to hold more cash. This suggests that as financial-expert directors improve board efficiency, financial-expert directors have a positive effect on firm cash holding.

To the extent that financial-expert directors perform a better monitoring and disciplining function, it would be expected that board of directors' financial

experience exercises their influence on the firm cash holding. To test the relationship between directors' financial experience and firm cash holding, the study follows previous studies focused on two primary contradicting hypotheses in relation to mitigating agency conflict of interest and firm management of cash holding:

The Flexibility Hypothesis: the traditional financial theory refers to the long-run value of a firm reliance mainly on firm investments. Finance flexibility allows managers to have substantial financial reserves to quickly finance suitable investments (Jensen 1986). According to Easterbrook (1984) and Jensen (1986), managers prefer financial flexibility and independence from capital market control. However, self-interested managers withhold excess cash from investment to help them survive unexpected adversity. According to the flexibility hypothesis, the less effective control is over managers, the more managers stack cash reserves. From previous arguments, financial-expert directors improve directors' monitoring and advisor role; thus, the study hypothesises the following:

The spending Hypothesis: according to the agency theory, self-interested managers prefer spending firm excess cash flow rather than holding it (Jensen and Meckling 1976). Spending hypothesis, in contradiction with flexibility hypothesis, suggests that the more effective monitoring is over managers, the more firm will retain cash. In light of the spending hypothesis and the positive effect of financial-experts on firm advisory and monitoring role, the study hypothesises the following:

Hypothesis 1: the fraction of accounting financial-expert directors have an effect on cash holding.

Hypothesis 2: the fraction of non-accounting financial-expert directors have an effect on cash holding.

4.3. Data and variables construction

4.3.1. Sample and scope

The study sample comprises publicly traded companies of Standard & Poor's (S&P) 500 (LargeCap), S&P 400 (MidCaps), S&P 600 (SmallCap). The sample period begins in 2000 and ends in 2017. The study excludes all financial firms SIC code

between 6000 and 6999 due to their involvement in inventory marketable securities which are included in cash and their need to meet legal capital requirements. Moreover, it excludes firms where their cash holding might be conditional on the regulatory requirement (Utilities). Firms in the sample are required to have positive cash holding and sale. To mitigate the outlier effects, all continuous variables winsorise at the top and bottom 1% of the distribution.

Table 4. 1 Selection criteria for the sample

Analysis of sample attrition at different stages of sample.

Criterion	# of firms
All firms in the S&P 1500	1500
Financial and Utilities firms	370
Missing data firms	165
Sample (excluding finance and Utilities firms and missing data firms)	965

All of this study's financial firm-specific information is collected using the COMPUSTAT North America database. The study uses BoardEx database to measure directors' previous financial experience and collect board characteristic variables. Industry classification is formed based on the Fama-French 48 industry classification. After excluding financial and utility firms and firms with missing data, the sample size includes 965 firms and 11,530 firm-year observations (see Table 4.1).

4.3.2. Variable definitions

This section presents the dependent and control variable definitions used in this part of the study. The study independent variable (the fraction of accounting financial experts and the fraction of non-accounting financial experts) definition and measure remains as described in Section 2.3.3.

4.3.2.1. Cash policy

To measure firm cash holding, the study uses three cash holding measures used in the literature: First, for the main analysis, following Harford et al. (2008), cash holding is measured as the ratio of cash to sale computed as the logarithm of cash and cash equivalent divided by total sale (*CH*); Second, as a robust check, it follows Opler et al. (1999) and Harford et al. (2008) and cash holding is measured as the ratio of cash

and marketable securities to net assets computed as the logarithm of assets minus cash and marketable securities. (*CH2*). Moreover, following Bates et al. (2009) and Nguyen et al. (2018), cash holding was also measured as the ratio of cash and marketable securities to total assets computed as the cash plus marketable securities divided by total assets (*CH3*).

4.3.2.2. Control variables

For the main model, a list of control variables was included that were identified in the literature to influence the corporate cash holding. These variables were motivated by Opler et al. (1999) and the study main objectives include: firm size, growth opportunities, cash flow, net working capital, financial leverage, cash flow volatility, research and development expense, capital expenditure and dividend policy.

Firm size (SIZE): prior literature shows mixed results when it comes to the relationship between firm size and a firm cash holding. Among many scholars, Miller and Orr (1966) argue that cash holding must be lower in larger firms due to economies of scales. Previous studies documented a positive relationship between firm size and the amount of cash holding (Ozkan and Ozkan 2004; Kalcheva and Lins 2007). When comparing large firms to small firms, to meet quality of investment and firm activities, large firms need to retain a larger amount of capital reserves (Opler et al. 1999; Chen and Chuang 2009). *SIZE* is computed as the logarithm of firm total assets at the end of the year.

Growth opportunities (GROWTH): The firm level of growth opportunities determines their amount of financial needs. Thus, as Dittmar and Mahrt-Smith (2003) propose, firms with greater growth opportunity prefer to hold more cash. As growth opportunities increase, the firms increase their cash reserves to avoid the additional cost of raising external financial funds (Myers and Majluf 1984). Boyle and Guthrie (2003) demonstrate that holding substantial cash reserves can help to maintain their potential growth opportunity alive. Previous literature shows a positive relationship between the strength of growth opportunity and firm cash holding (Opler et al. 1999; Ozkan and Ozkan 2004). The study measures the firm growth opportunity as the firm market-to-book ratio.

Cash flows (CF): firm cash flow symbolises the firm source of cash (Chen and Chuang 2009). Literature anticipated mixed results when it comes to the relationship between cash flow and cash holding. The pecking order theory assumes that increasing the firm cash flow should boost the firm cash holding where the trade-off theory predicts an inverse relationship (Boubaker et al. 2015). The study measures cash flow as the ratio of earnings before interests, taxes, depreciation and amortisation less interests, taxes, and dividends, to assets net of cash and marketable securities.

Net working capital (NWC): the firm net working capital is used as a proxy for liquidity (Harford et al. 2008). It shows the firm ability to self-finance, discounting for cash. According to Kim et al. (1998), a firm *NWC* is expected to have a negative effect on the level of cash holding. *NWC* is computed as working capital minus cash and marketable securities, divided by the total assets net of cash and marketable securities.

Financial leverage (LEV): firm financial leverage is an indicator of firm ability to issue debt. Firms may use debt as a financial alternative to holding great amounts of cash and marketable securities (Ozkan and Ozkan 2004). Literature shows that highly levered firms have lower cash holding (Opler et al. 1999; Ozkan and Ozkan 2004; Harford et al. 2008; Florackis and Sainani 2018). *LEV* is calculated as total debt, defined as long term debt, divided by assets net of cash and marketable securities.

Cash flow volatility (CFVOL): Minton and Schrand (1999) argue that in the existence of capital market imperfection, high rate of cash flow shortfalls raises the firm's cost of external capital. Therefore, firms with high cash flow volatility are anticipated to hold more cash to mitigate the predicted costs of financial constraints. Literature shows a significantly positive relationship between *CFVOL* and cash reserves (Opler et al. 1999; Harford et al. 2008; Florackis and Sainani 2018). The measure used in the study for *CFVOL* is the standard deviation of cash flow from the past four years.

Research and development (R&D) expense: According to Opler et al. (1999), research and development expense can be used as an indicator to measure the cost of financial distress. Studies show that research and development have a positive and significant relationship with cash holding (Florackis and Sainani 2018). *R&D*

calculated as firm research and development expenditure to total sales. Firms that do not report *R&D* expenses are categorised as firms with no *R&D* expenses.

Capital expenditures (CAPEXP): Capital expenditure reflects on the firm investment activities; it is an indicator of managers incentive to increase the size of their firm (Harford et al. 2008), since cash would be a good resource to finance capital expenditure (Boubaker et al. 2015). *CAPEXP* is computed as the ratio of capital expenditure to total assets.

Dividend policy (DIV): Following Opler et al. (1999) and Chen and Chuang (2009), the study control for the firm dividend policy. *DIV* is a dummy variable that takes the value of 1 if the firm paid dividend and 0 otherwise.

The model also controls for board of directors' demography that was argued to affect firm level of cash holding; the study control for the board of directors' size (*BoardSize*) measured as the logarithm of the sum of board members and board independence (*Indep*) measured as the fraction of independent directors to board size.

Moreover, given that the main variables may change over time, the study also adds control for year and industry to control for the unobserved heterogeneity effect of time and firm. Year fixed effect controls for the time trends of financial expertise on board and firm cash holding, where the industry fixed effect reflects factors related to a specific industry that could influence the determinants of both; appointing directors with financial experience and firm cash holding. Industry fixed effect was added based on Fama-French 48 industry classification.

4.4. Methodology

4.4.1. Empirical model

To empirically test the relationship between the fraction of financial-experts on board and firm cash holding, motivated by Harford et al. (2008) study, this research develops the following model:

$$\log\left(\frac{C_{i,t}}{Sale_{i,t}}\right) = \beta_0 + \beta_1\, fraction\ of\ financial\ experts\ directors_{i,(t-1)} + \gamma\ Controls_{i,(t-1)} + Year\ FE + Industry\ FE + \varepsilon_{i,t} \quad (10)$$

Where i represent the firm and t represent the year, cash holding is the dependent variable measured as the natural logarithm of $C_{i,t}$ (the firm cash and cash equivalents) divided by the firm $Sale_{i,t}$ as total sale (CH). $fraction\ of\ financial\ experts\ directors_{i,(t-1)}$ represent the study independent variables which are the fraction of firm different financial-experts (accounting and non-accounting financial experience) on board. The model $Controls_{i,t-1}$represent all study controls that were proven in the literature to influence the corporate cash holding. The model adds $Year\ FE$ and $Industry\ FE$. This study control for industry effect follows Fama and French 48 industry classification. Following Harford et al. (2008) and Petersen (2009) and reports out t-statistics using standard errors corrected for clustering at firm level.

4.5. Descriptive analysis

This section provides the sample descriptive analysis through a summary of the sample characteristics and variable summary statistics and correlation.

4.5.1. Sample characteristics

This section provides sample characteristics through descriptive analysis of the number of observations spread through the sample years, and sample firm industries distribution.

Table 4.2 panel A shows the number of observations spread through the sample period. The number of firm observations start at only 56 firms in 2000 and increases yearly to reach 886 firms in 2016. The total firm-year observation comes to 11,530.

Table 4. 2 Descriptive statistic

The study sample contain 965 firms from S&P 1500 non-financial and non-utilities firms and 11,530 firm-year observation over the period from 2000 to 2017. The Fama-French 10-industry classification is used for Panel B.

Panel A: observation yearly distribution		
Year	Number of firm obs.	% of firm obs. from the total sample.
2000	56	0.5%
2001	415	3.6%
2002	468	4.1%
2003	497	4.3%
2004	631	5.5%
2005	664	5.8%
2006	697	6.0%
2007	723	6.3%
2008	740	6.4%
2009	754	6.5%
2010	772	6.7%
2011	793	6.9%
2012	825	7.2%
2013	839	7.3%
2014	853	7.4%
2015	883	7.7%
2016	886	7.7%
2017	34	0.3%
Total	11530	100%

Panel B on Table 4.3 provides the sample firm distribution among Fama-French 10 industry classifications. It shows that tech and manufacturing industry has the highest number of firms in the sample with 193 and 189 firms respectively, each representing approximately 20% of the sample firms. Following tech and manufacturing industry, shop and other industries represent 16% (156 firms) and 14% (138 firms) of the sample firms correspondingly. Consumer durables and telecommunication industries came last with the number of firms' observations, with only 3% (32 firms) and 2% (23 firms) of the firms' study sample. Table 4.3 also shows that the distribution of firm-year observation through industries has a very similar percentage to the firms' observations distribution.

Table 4. 3 Descriptive statistic (continue)

Panel B: Sample industry firm distribution based on Fama-French 10 industry classification.

Industry	No. of firms obs.	%of firms	No of firm year obs.	% of firms
Durables	32	3%	351	3%
Energy	53	5%	624	5%
High Tech	193	20%	2430	21%
Healthcare	107	11%	1,178	10%
Manufacturing	189	20%	2361	20%
Non-Durables	74	8%	910	8%
Other	138	14%	1,656	14%
Shops	156	16%	1,813	16%
Telecom	23	2%	207	2%
Utilities	0	0%	0	0%
Total	965	100%	11530	100%

4.5.2. Summary statistics and correlation.

This section provides the study main variables summary statistic and correlation. Table 4.4 presents the sample descriptive statistic for the main variables including the mean, median, standard deviation, 5th, 25th, 75th and 95th percentiles. The main variable in panel A, *CH*, has a mean (median) variable of -2.678 (-2.529)[15] and a standard deviation of 1.439, higher than those reported in Harford et al. (2008) of US market. Panel B shows the sample descriptive static of independent variables *Frac. of Acc. Fin. Exp. Dir.* and *Frac. of Non-Acc. Fin. Exp. Dir.*. The sample shows higher *Frac. of Acc. Fin. Exp. Dir.* with a mean of 28.3% and a median of 25% when compared to *Frac. of Non-Acc. Fin. Exp. Dir.* with a mean of 13.6% and a median of 11.1%. *Frac. of Acc. Fin. Exp. Dir.* has a standard deviation of 0.283 where *Frac. of Non-Acc. Fin. Exp. Dir.* has a slandered deviation of 0.136.

[15] Due to the skewness in the ratio of cash to sale with a mean of 0.194 , a median of 0.080 and a standard deviation of 1.453, the study log cash holding.

Table 4. 4 Summary statistics

This table presents the study variables summary statistic. CH: is the firm level of cash holding, measured as the log of the firm ratio of cash to sale *Frac. of Acc. Fin. Exp. Dir.*: the percentage of accounting financial-experts on board. *Frac. of Non-Acc. Fin. Exp. Dir.* : the percentage of non-accounting financial-experts on board. *SIZE*: firm size measured as the log of the firm total assets. *NWC*: is the firm net working capital measured as firm working capital minus cash divided by firm assets net of cash. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CAPEXP*: is the firm capital expenditure measured divided by total assets. *CF*: is the firm cash flow divided by assets net of cash. *AQC*: is the firm acquisitions divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past four years. DIV: is dividends. It is a dummy variable equal to 1 if the firm paid dividend and 0 otherwise. All continues variables are winsorised at the bottom and top 1 % levels.

Variable	Obs.	Mean	Std. dev	5th Pctl	25th Pctl	Median	75th Pctl	95th Pctl
Panel A: Cash holding (dependent variable)								
CH	11,530	-2.678	1.439	-5.173	-3.520	-2.529	-1.691	-0.634
Panel B: Financial Experience measures (independent variables)								
Frac. of Acc. Fin. Exp. Dir.	11,530	0.283	0.172	0.000	0.143	0.250	0.400	0.600
Frac. of Non-Acc. Fin. Exp. Dir.	11,530	0.136	0.128	0.000	0.000	0.111	0.200	0.375
Panel C: Firm financial information (control variables)								
SIZE	11,530	7.587	1.590	5.216	6.418	7.460	8.624	10.421
NWC	11,530	0.134	0.180	-0.127	0.010	0.113	0.239	0.472
LEV	11,530	0.199	0.183	0.000	0.018	0.178	0.303	0.540
R&D	11,530	0.043	0.086	0.000	0.000	0.003	0.044	0.204
M/B	11,530	1.915	1.714	0.378	0.835	1.398	2.348	5.398
CAPEXP	11,530	0.050	0.047	0.008	0.020	0.035	0.062	0.149
CF	11,530	0.113	0.103	-0.026	0.071	0.111	0.160	0.269
AQC	11,530	0.034	0.069	0.000	0.000	0.002	0.031	0.186

CFVOL	11,530	0.047	0.071	0.005	0.013	0.024	0.049	0.166
DIV	11,530	0.586	0.493	0.000	0.000	1.000	1.000	1.000

Table 4.4 panel C shows the study sample control variables descriptive static. In terms of firm financial information, firms in the sample has an average firm size of 7.587 with high and low firm *SIZE* (5.216 and 10.421, 5th and 95th percentile respectively), higher than reported in Harford et al. (2008)[16]. The mean of the sample net working capital to net assets of 13.4%, the sample firms have low and high *NWC* (-0.127 and 0.472, 5th and 95th percentile correspondingly). The sample mean of firm leverage ratio is 19.9% slightly lower than Harford et al. (2008) study sample. There are unlevered firms in the sample with 0 *LEV* as the 5th percentile and increases only to 0.540 as the 95th percentile. Firm in the sample mean of research and development to sale ratio of 4.3%. More than 25% of sample firms pay no research and development expenses. However, *R&D* reached 0.204 in 95th percentile. As for *M*/*B* ratio, the sample mean is 1.915. The sample is constructed from high and low growth opportunity firms with *M/B* of 0.375 in the 5th percentile and 5.398 in the 95th percentile. Sample firms mean of capital expenditure to total assets of 0.050 vary similarly to those reported in Harford et al. (2008). The average firms of the sample have cash flow to net assets of 11.3%, acquisition to net assets ratio of 3.4%, cash flow volatility of 0.047 and about 0.586 of firms' payout dividends.

Table 4.5 and Table 4.6 reports the correlation coefficient between the main variables used in the study. The correlation matrix provides an insight into the relationship between the study dependent and independent variables. It also specifies a potential multicollinearity problem that might lead to false estimate. Spearman (Pearson) correlation coefficients are shown on below (above) the diagonal. Several features of the data are worth highlighting. The relationship between the *Frac. of Acc. Fin. Exp. Dir.* shows a positive magnitude to *CH* and significance at 10% level in Spearman correlation and insignificance at Pearson correlation., inconsistent with the research hypothesis. Moreover, the correlation between *Frac. of Non-Acc. Fin. Exp. Dir.* and *CH* is positive and statistically insignificant at any level for Spearman and significant at 10% level in Pearson correlations. These changes in significance indicate inconsistent significance level for financial-experts' variables. The correlation matrix also shows that all control variables are significantly correlated to *CH* at the 1% level.

[16] The sample firms average assets is 7.8$ billion and their mean is 1.7$ billion. Due to the data skewness, the firm size is calculated using the log of firm assets.

Spearman (Pearson) correlation coefficients provide similar results for almost all variables with similar degrees and significance levels. The correlation matrix shows no potential multicollinearity between the study variables[17]

[17] Another way to assess multicollinearity problem is through calculating the variance inflation factor (VIF) for all independent variables. The VIF results show that the maximum VIF takes the value of 1.91 where the lowest VIF is 1.05. These values are below the 10 rule of thumb threshold provided by Chatterjee, S. and Hadi, A. S. 2015. *Regression analysis by example*. John Wiley & Sons.. This indicated that the multicollinearity issue is unlikely to be presented in this study.

Table 4. 5 Correlation matrix

This table presents the study variables correlation matrix. Spearman (Pearson) correlation coefficients are shown on below (above) the diagonal. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6	7
CH	1	0.0115	0.0149*	-0.1176***	0.098***	-0.0991***	0.4501***
Frac. of Acc. Fin. Exp. Dir.	0.0158*	1	0.1929***	0.1613***	-0.1012***	0.1409***	-0.0437***
Frac. of Non-Acc. Fin. Exp. Dir.	0.0022	0.2082***	1	0.006	-0.0462***	0.0695***	-0.0536***
SIZE	-0.1559***	0.1435***	0.0012	1	-0.3889***	0.3153***	-0.1885***
NWC	0.1083***	-0.0845***	-0.0687***	-0.4355***	1	-0.2917***	0.2406***
LEV	-0.2085***	0.15***	0.0431***	0.4426***	-0.3474***	1	-0.1559***
R&D	0.4879***	-0.006	-0.0423***	-0.1587***	0.2405***	-0.199***	1
M/B	0.422***	-0.0196**	0.0251***	-0.3475***	0.2327***	-0.4417***	0.387***
CAPEXP	-0.2617***	-0.05***	0.0626***	0.1151***	-0.2139***	0.0682***	-0.3362***
CF	0.1349***	-0.0142	0.0258***	-0.1269***	0.09***	-0.2976***	0.0483***
AQC	-0.03***	0.0438***	-0.0285***	0.0752***	-0.0345***	0.0913***	0.1066***
CFVOL	0.3996***	-0.0591***	-0.0155*	-0.3159***	0.1904***	-0.197***	0.3177***
DIV	-0.2561***	0.0473***	0.021**	0.3461***	-0.1617***	0.1566***	-0.2101***

Table 4. 6 Correlation matrix (continue)

This table presents the study variables correlation matrix. Spearman (Pearson) correlation coefficients are shown on below (above) the diagonal. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	8	9	10	11	12	13
CH	0.3605***	-0.1969***	0.0058	0.0003	0.2979***	-0.2085***
Frac. of Acc. Fin. Exp. Dir.	-0.0319***	-0.0597***	-0.0048	0.0254***	-0.0497***	0.0561***
Frac. of Non-Acc. Fin. Exp. Dir.	0.0173**	0.0204**	0.0436***	-0.0071	-0.0228***	0.0298***
SIZE	-0.3199***	0.0183**	-0.0544***	-0.0347***	-0.2721***	0.3619***
NWC	0.1666***	-0.2025***	0.0061	-0.0677***	0.1009***	-0.1668***
LEV	-0.3299***	-0.0335***	-0.2334***	0.0665***	-0.0883***	0.1432***
R&D	0.3625***	-0.1738***	-0.2456***	0.047***	0.4099***	-0.308***
M/B	1	0.0174**	0.4029***	-0.0239***	0.2814***	-0.2272***
CAPEXP	-0.058***	1	0.1691***	-0.1388***	-0.065***	-0.0071
CF	0.6259***	0.245***	1	-0.0393***	-0.1088***	0.0616***
AQC	0.0034	-0.2201***	-0.0444***	1	-0.0014	-0.0781***
CFVOL	0.2669***	-0.1139***	0.0935***	-0.0877***	1	-0.2788***
DIV	-0.1746***	0.1119***	0.0378***	-0.0191**	-0.3153***	1

4.6. Regression Results

4.6.1. Cash holding and financial experience on board

To test the relationship between the fraction of financial experts on board their effect on firm cash holding, the study estimates Eq. (10) using ordinary least squares (OLS) regression with industry and year fixed effect. All continuous variables were winsorised by 1%. Models 1 and 3 in Table 4.7 present the study main regression result testing the effect the fraction of accounting financial-experts and non-accounting financial-experts on board, correspondingly. The result in Model 1 tests the relationship between the *Frac. of Acc. Fin. Exp. Dir.* and firm *CH* and shows that after controlling for firm financial variables, Model 1 proposes that *CH* is negatively related to the *Frac. of Acc. Fin. Exp. Dir.*. The relationship is shown to be significant at 5% level. On the other hand, Model 3 duplicates the first model regression using firm *Frac. of Non-Acc. Fin. Exp. Dir.* as financial experience measure and shows a positive non-significant relationship between the *Frac. of Acc. Fin. Exp. Dir.* and firm *CH*. Moving to firm-related control variables, the table shows that all control variables have their expected sign. As discussed previously, firms with high cash holding tend to be significant in size, high growth opportunity, substantial cash flow and high cash flow volatility, whereas, firms with low cash holding have high net working capital, leverage, high capital expenditure, high acquisition and pay more dividend.

4.6.2. Changes in cash holding and financial experience on board

Even though the relationship between the board of directors' financial experience and firm cash holding is negatively significant, OLS regression does not account for sample endogeneity. The main concern related to sample endogeneity is that the relationship may be subject to reverse casualty; that is, the relationship may be a result of firms with low cash holding possibly hiring more financial-experts rather than a higher fraction of financial-experts holding lower cash of firm; alternatively, that fraction of board financial-experts and cash holding are jointly determined. To test whether the directors' financial experience variables are related to the change in a firm's cash holdings, the study follows Harford et al. (2008) research and control for the endogeneity concern by adding the lagged variable of firm cash holding on the study model. This model offers evidence on the fraction of financial experience on

board ability to predict firm future cash holding. Moreover, as an additional control for endogenous choice, the lagged fraction of financial-expert variable was added representing the historical values.

Models 2 and 4 to 6 in Table 4.7 represent the results of the analysis after accounting for the endogenous concerns. Models 2 and 4 duplicate Models 1 and 3, respectively, using an additional variable of lagged cash holding. Models 2 and 4 show similar results to previous regressions (Models 1 and 3 correspondingly). The significance level of Frac. of Acc. Fin. Exp. Dir. remains significant at 5% level in Model 2 when comparing the results to Model 1, where the *Frac. of Acc. Fin. Exp. Dir.* coefficients rise from -0.385 to -0.125. The *Frac. of Non-Acc. Fin. Exp. Dir.* remain insignificant in Model 4 when comparing the results in Model 2. As should be expected, the firm lagged cash holding explains a significant amount of the current cash holding with coefficients of 0.732 and significance at 1% level. This is also shown in the jump of the model R-square from 0.41 in Models 1 and 3 to 0.74 in Models 2 and 4. Model 5 tests the relationship between board financial-experts different measured combined (accounting and non-accounting financial-experts) to firm cash holding and found similar results with the same level of significance and magnitude.

In previous models, it assumes a linear relationship between cash holding and board financial experience. In Model 6, the study examines the effect of the fraction of financial experts on board in a non-linear relationship. The fraction of accounting financial-experts is split into quartiles and two new variables are added representing the first and fourth quartiles. The results found that only the coefficient of the 4th quartile to be significant at 1% level. This suggests that the real relationship is asymmetric and the coefficient presence with the linear model to be inaccurate[18].

[18] A similar type of cut was applied on the non-accounting financial-experts (although the results are not reported in the thesis), both variables were shown to be insignificant.

Table 4. 7 Financial experience and firm cash holding

This table reports the results of the relation between financial-experts and firm cash holding. The dependent variable is the firm cash holding (*CH*), measured as the logarithm of cash and cash equivalent divided by total sale. The main independent variables are the percentage of accounting financial-experts on board *(Frac. of Acc. Fin. Exp. Dir*.) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). *SIZE*: firm size measured as the log of the firm total assets. NWC: is the firm net working capital measured as firm working capital minus cash divided by firm assets net of cash. LEV: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CAPEXP*: is the firm capital expenditure measured divided by total assets. *CF*: is the firm cash flow divided by assets net of cash. *AQC*: is the firm acquisitions divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past four years. *DIV*: is dividends. It is a dummy variable equal to 1 if the firm paid dividend and 0 otherwise. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	CH					
	(1)	(2)	(3)	(4)	(5)	(6)
CH(t-1)		0.732***		0.733***	0.732***	0.732***
		(0.0115)		(0.0116)	(0.0115)	(0.0115)
Frac. of Acc. Fin. Exp. Dir.(t-1)	-0.385**	-0.125**			-0.128**	
	(0.171)	(0.0573)			(0.0571)	
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)			0.0463	0.0640	0.0701	
			(0.213)	(0.0677)	(0.0678)	
Frac. of Acc. Fin. Exp. Dir.(t-1)(1Q)						0.0170
						(0.0177)
Frac. of Acc. Fin. Exp. Dir.(t-1)(4Q)						-0.0513***
						(0.0184)
SIZE	0.0377*	-0.00301	0.0359*	-0.00337	-0.00261	-0.00320
	(0.0195)	(0.00634)	(0.0195)	(0.00629)	(0.00631)	(0.00632)

NWC	-0.329**	-0.406***	-0.315*	-0.402***	-0.406***	-0.402***
	(0.162)	(0.0563)	(0.162)	(0.0562)	(0.0564)	(0.0564)
LEV	-0.0597	0.113**	-0.0977	0.102*	0.114**	0.113**
	(0.162)	(0.0562)	(0.162)	(0.0556)	(0.0562)	(0.0560)
R&D	3.985***	1.040***	3.987***	1.039***	1.042***	1.037***
	(0.387)	(0.136)	(0.388)	(0.137)	(0.137)	(0.137)
M/B	0.173***	0.0568***	0.172***	0.0561***	0.0567***	0.0568***
	(0.0149)	(0.00640)	(0.0149)	(0.00638)	(0.00640)	(0.00640)
CAPEXP	-4.825***	-3.319***	-4.790***	-3.310***	-3.325***	-3.325***
	(0.728)	(0.257)	(0.734)	(0.259)	(0.258)	(0.257)
CF	0.674***	0.400***	0.666***	0.395***	0.398***	0.400***
	(0.221)	(0.111)	(0.221)	(0.111)	(0.111)	(0.111)
AQC	-1.123***	-1.858***	-1.116***	-1.857***	-1.859***	-1.862***
	(0.218)	(0.123)	(0.218)	(0.123)	(0.123)	(0.123)
CFVOL	1.057***	-0.0922	1.047***	-0.0966	-0.0921	-0.0940
	(0.293)	(0.114)	(0.294)	(0.115)	(0.114)	(0.115)
DIV	-0.199***	-0.0864***	-0.202***	-0.0871***	-0.0865***	-0.0865***
	(0.0601)	(0.0196)	(0.0604)	(0.0196)	(0.0196)	(0.0196)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,530	11,498	11,530	11,498	11,498	11,498
R-squared	0.408	0.739	0.407	0.739	0.739	0.739

Overall results suggest that financial-experts on board can influence firm cash position as accounting financial-experts were found to be negatively related to firm cash holding. However, the fraction of non-accounting financial-experts on board was not related in all cross-sectional analysis. Firms with a higher fraction of accounting financial-experts on board retain less cash. However, results were driven by a high fraction of financial-experts on board reducing firm cash holding and not by a lower fraction of financial-experts on board holding more cash. In relation to cash holding, the regression results suggest that accounting financial-experts appear to influence board monitoring role, where non-accounting financial-experts do not have any significant influence. Increasing board financial-experts through the increase of the fraction of non-accounting financial-expert directors would not have the same influence on cash holding monitoring as when increased through the fraction of accounting financial-expert directors. This result is consistent with the traditional financial theory argument on the flexibility hypothesis where managers prefer financial flexibility and independence from capital market control. However, enchanted managers reserve on excess cash form investment to help them survive unexpected adversity. According to the hypothesis, as control over managers decreases, managers stack more cash reserves (Fama and Jensen 1983; Easterbrook 1984). This study shows that enhancing board control over managers through more accounting financial-expert directors reduces managers' ability to retain more cash on the firm.

4.6.3. Financial experience, investment decisions and valuation

According to Harford et al. (2008), a firm's cash position is affected by the level of shareholders' protection. Referring to the shareholders' right hypothesis; as shareholders' rights increase, shareholders would allow managers to hold more higher cash reserves, giving their ability to control the way in which cash is spent. To better understand the optimal outcome of increasing shareholder protection through financial-expert directors, the study tests the relationship between excess cash holding, financial experience and firm investment. Moreover, the study tests the relationship between financial-expert directors and excess cash holding on firm value.

4.6.3.1. Financial experience and investment decisions

In addition to the study main regression, it further investigates the relationship between firm investment decisions and directors' financial experience. Precisely, it investigates how excess cash, directors financial experience and the interaction between these two variables are related to firm investment decisions. The study follows Harford et al. (2008) and uses two internal investment measurement of (i) capital expenditure and (ii) R&D expenditure and one external investment decisions (iii) acquisition.

Following Harford et al. (2008), firm cash position is defined as the unexplained amount of cash holding and the variations in the unexplained amount. The unexplained amount of cash holding is measured as residual from a regression of cash holdings on firm size, leverage, growth options, profitability, the ratio of working capital to assets, cash flow volatility, R&D to sales, capital expenditures to assets and acquisition to sales controlling for industry and year fixed effects.

When examining how the interaction between the fraction on financial experts on board and firm cash holding relates to firm investment decisions, this part of the study creates a set of interaction variables between firm different financial-expert directors (accounting and non-accounting financial-experts) and cash holding residuals (measuring the excess cash) using the following model:

$$IndAdjInvestment_{i,t} = \beta_0 + \beta_1 XCash_{i,t-1} + \beta_2 \Delta XCash_{i,t-1} + \beta_3 fraction\ of\ financial\ experts\ directors_{i,t-1} + \beta_4\ frraction\ of\ financial\ experts\ direstors_{i,t-1} \times XCash_{i,t-1} + + \gamma\ Controls_{i,t} + Year\ dummy + Industry\ dummy + \varepsilon_{i,t} \quad (11)$$

Where $\Delta\, IndAdjInvestment_{i,t}$ for firm *i* for year *t* represent the firm change in industry adjusted investment. These are: industry adjusted capital expenditure, industry adjusted research and development and industry adjusted acquisition. All industry adjusted variables are calculated as firm variable minus the mean of the industry variable. All industry figures are calculated using all firms in COMPUSTAT following Fama-French 48 industry classification. $XCash_{i,t-1}$ is measured by the lagged year cash holding regression residual. Cash holding regression control values include firm size measured by firm total assets), leverage, growth opportunity,

profitability, working capital to total assets, cash flow volatility, R&D to sale, capital expenditure to assets and acquisition to sale, the regression also account for year and industry fixed effect. $\Delta XCash_{i,t-1}$ is the change in the lagged excess cash holding from the previous year. $fraction\ of\ financial\ experts\ directors_{i,t-1}$ is the lagged value of the fraction of financial expert directors on board (measured by the fraction of accounting financial-experts on board or by the fraction of non-accounting financial-experts on board). Additional control variables ($Controls_{i,t}$) are added following Harford et al. (2008), which studied the effect of corporate governance and firm investment decisions and profitability, and Comment and Schwert (1995) who investigated the effect on firm corporate governance to the profitability of acquisition activities. Control variables include the market model residual over the estimation period, average prior four years sales growth, average prior four years net working capital (less cash), average prior four years leverage (the ratio of long-term debt to market value), average prior four years price-earnings ratio and the lagged firm size. The model also accounts for the year and industry dummy variables.

Table 4.8 Models 1, 2, and 3 shows the result of the effect of financial experts on board on firm investment decisions. All models show low R-square. The analysis is directed on the change in the firm industry investment decisions, which, according to Harford et al. (2008) are expected to have a considerable idiosyncratic component. When it comes to firm industry adjusted investment decision, results suggest that the fraction of accounting and non-accounting financial-experts has no effect on the firm industry adjusted capital expenditure, firm industry adjusted R&D or a firm industry adjusted acquisition (see Models 1, 2, and 3 correspondingly). Although the firm lagged excess cash holding positively influences the firm industry adjusted acquisition and the change in the firm lagged excess cash holding increases the firm industry adjusted acquisition and capital expenditure, results suggest that the interaction between different financial experiences and excess cash holding have no effect on firm industry-adjusted investment decisions.

4.6.3.2. Financial experience and payout policy

A different explanation for the reason why firms have low cash holding is making the decision for distributing cash to shareholders. Mirroring the analysis of investment decision, this study investigates how financial-experts on board are related to firm

payout policy; precisely, the firm dividend distribution and repurchases. Following Harford et al. (2008), the study measures the yearly industry-adjustment of dividend and repurchase. To capture the gradual changes in industry adjusted-dividend due to conservative dividend policy, the study measures the changes in firm industry-adjusted payout ratios of dividend and repurchases (see Brav et al. (2005) and Harford et al. (2008)).

When testing the effect financial experts and firm excess cash have on firm payout policy, results reported in Table 4.8 (Model 4) shows that change in firm excess cash positively influences the firm industry adjusted repurchase decision where Model 5 shows that firm lagged excess cash holding to be negatively related to the firm change in dividend payout. For financial-expert variables, the study found that the fraction of accounting and non-accounting financial-experts on board not to affect firm change in repurchases or dividend payments (see Models 4 and 5). However, the interaction variables between accounting financial-experience and excess cash have a significant effect on firm dividend payment. This suggests that, even though account financial-experts do not affect the change of firm industry-payout policy, they do affect the distribution of excess cash holdings to shareholders in the form of dividend only.

Payout policy results suggest that firms do not differ in the change of their payout policies based on the fraction of financial-expert directors on board. However, the fraction of accounting financial-experts explains a great deal of the firm increase in industry adjusted-dividend payments from firm excess cash holding.

Table 4. 8 Financial experience and cash holding as they relate to firm' investment and payout decisions

This table depicts the relationship between investment decisions and payout policy and financial-experts on board. In relation to investment decisions, the dependent variables are the change in industry-adjusted acquisition, R&D expenditure and capital expenditure. In relation to payout decisions the dependent variables are industry-adjusted dividend and repurchase. All dependent variables are yearly industry-adjusted using Fama-French 48 industry classification system. To avoid selection bias, industry median is calculated using all COMPUSTAT data. Firm cash position is the unexplained cash holding and the change in their cash position. That is, the residual from regressing cash holding on firm specific characteristics representing the firm excess cash holding. The cash holding regression control for firm size, leverage, growth option, profitability, ratio of working capital to assets, four years cash flow volatility, R&D to sale, capital expenditure to assets, and acquisition to sale. The cash holding regression also control for industry and year effects. The board financial experience variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). Board financial experience variables are lagged one year. The interaction between board financial experience and cash holding residuals examine how the use of the firm excess cash and financial experience related to investment decisions and payput policy. More control variables including the firm average sale growth (*SaleGrowth*), average leverage (*LEV*), average net working capital net of cash (*NWC*), average Price/Earnings ratio (*PE*), market model residual calculated over the estimated period (*MarketResidual*), and lagged firm size (*SIZE*) (averages are calculated over the prior four years). Standard error is estimated with clustered error at firm level. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Investment Decisions			Payout Policy	
	ΔInd Adjusted Acquisitions	ΔInd Adjusted R&D	ΔInd Adjusted Capital Exp.	ΔInd Adjusted Repurchase	ΔInd Adjusted Dividend
	(1)	(2)	(3)	(4)	(5)
CH-residual(t-1)	0.00628***	0.000554	0.000810	0.0502	-0.106*
	(0.00233)	(0.00231)	(0.00109)	(0.0499)	(0.0640)
Δ*CH-residual(t-1)*	0.0131***	-0.00101	0.00162**	0.217***	-0.0156
	(0.00209)	(0.000840)	(0.000645)	(0.0350)	(0.0385)
Frac. of Acc. Fin. Exp. Dir.(t-1)	0.000184	-0.00261	0.00115	0.0877	-0.156
	(0.00317)	(0.00180)	(0.00154)	(0.0908)	(0.142)

*Frac. of Acc. Fin. Exp. Dir.(t-1)*CH-residual(t-1)*	-0.00234	0.0140	7.52e-05	0.217	0.507**
	(0.00747)	(0.0130)	(0.00274)	(0.173)	(0.244)
Frac. of Non-Acc. Fin. Exp. Dir.((t-1)	-0.000962	-0.00194	-0.000937	0.0695	0.197
	(0.00414)	(0.00272)	(0.00189)	(0.103)	(0.186)
*Frac. of Non-Acc. Fin. Exp. Dir.((t-1)*CH-residual(t-1)*	0.000950	3.83e-05	0.00370	-0.183	0.445
	(0.0104)	(0.00868)	(0.00371)	(0.188)	(0.685)
SaleGrowth	-0.0273***	-0.0179	-0.00262	0.568***	0.526**
	(0.00514)	(0.0109)	(0.00265)	(0.0936)	(0.233)
LEV	-0.00516*	0.00488**	0.00715***	-0.307***	-0.317**
	(0.00295)	(0.00225)	(0.00198)	(0.104)	(0.158)
NWC	-0.0141***	0.00888*	0.00327	-0.126	-0.276
	(0.00398)	(0.00514)	(0.00254)	(0.103)	(0.206)
PE	-1.52e-05	1.11e-06	-6.27e-06	0.000245	-0.0179***
	(1.64e-05)	(1.04e-05)	(6.02e-06)	(0.000188)	(0.00578)
MarketResidual	0.0495	0.242*	0.268***	8.614**	15.59
	(0.219)	(0.128)	(0.0926)	(4.110)	(12.33)
SIZE(t-1)	-0.00423***	0.00104***	-0.000123	0.0520***	-0.00830
	(0.000399)	(0.000264)	(0.000168)	(0.00740)	(0.0149)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	9,637	9,770	9,768	9,204	9,787
R-squared	0.026	0.017	0.011	0.043	0.015

4.6.4. Financial experience and profitability.

Although investment decision and payout policy relations to directors' financial experience are informative, they show nothing about the effect on shareholders' wealth. In this section, the investigation focuses on firm performance. It answers the question of whether different investment and payout decisions matter to firm future profitability. To empirically measure the effect of financial experts on board on firm profitability, motivated by Harford et al. (2008), the study develops the following model:

$$IndAdjProf_{i,t} = \beta_0 + \beta_1 IndAdjProf_{i,t-1} + \beta_2 XCash_{i,t-1} + \beta_3 \Delta XCash_{i,t-1} + \beta_4\ fraction\ of\ financial\ experts\ on\ board_{i,t-1} + \beta_5\ fraction\ of\ financial\ experts\ on\ board_{i,t-1} * XCash_{i,t-1} + \gamma\ Controls_{i,t} + Year\ dummy + Industry\ dummy + \varepsilon_{i,t} \quad (12)$$

Where $IndAdjProf_{i,t}$ is the firm industry adjusted profitability, firm profitability was calculated as firm profitability adjusted by the firm industry mean profitability. Industry mean profitability was calculated using all COMPUSTAT firm based in Fama-French 48 industry classifications that also capture the industry and yearly fixed effect. $XCash_{i,t-1}$ is the lagged excess cash holdings measured by the cash holding regression residual. Cash holding regression control values include firm size (measured by firm total assets), leverage, growth opportunity, profitability, working capital to total assets, cash flow volatility, R&D to sale, capital expenditure to assets and acquisition to sale; the regression also accounts for year and industry fixed effect. $\Delta XCash_{i,t-1}$ is the change in the lagged excess cash holding from the previous year. $fraction\ of\ financial\ experts\ directors_{i,t-1}$ is the lagged value of the fraction of financial expert directors on board (measured by the fraction of accounting financial-experts on board or by the fraction of non-accounting financial-experts on board). To control for the fact that firm characteristics can be jointly determinant, the model adds the lagged industry adjusted profitability. The model also controls for firm size, average prior four years sales growth, average prior four years net working capital (less cash), average prior four years leverage (the ratio of long-term debt to market value).

Table 4. 9 Financial experience and cash holding in relation to firm profitability and market-to-book ratio.

This table examines the effect of financial-experts on board on firm profitability and market-to-book ratio in relation to their industry peers. Due to endogeneity concerns, the regression includes firm lagged industry adjusted profitability or industry adjusted market-to-book ratio and lag board financial experience measures. All dependent variables are yearly industry-adjusted using Fama-French 48 industry classification system. To avoid selection bias, industry median is calculated using all COMPUSTAT data. Firm cash position is the unexplained cash holding and the change in their cash position; that is, the residual from regressing cash holding on firm specific characteristics representing the firm excess cash holding. The cash holding regression control for firm size, leverage, growth option, profitability, ratio of working capital to assets, four years cash flow volatility, R&D to sale, capital expenditure to assets, and acquisition to sale. The cash holding regression also controls for industry and year effects. The board financial experience variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir*.) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). Board financial experience variables are lagged one year. The interaction between board financial experience and cash holding residuals is to examine how the use of the firm excess cash and financial experience related to investment decisions and payput policy. More control variables, including the firm average sale growth (*SaleGrowth*), average leverage (*LEV*), average net working capital net of cash (*NWC*), and firm size (averages are calculated over the prior four years). Standard error is estimated with clustered error at firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	IndAProf	*IndAMB*
	(1)	(2)
IndAMB(t-1)		0.609***
		(0.0365)
IndAProf(t-1)	0.572***	
	(0.0167)	
CH-residual(t-1)	-0.00749***	-0.136*
	(0.00226)	(0.0783)
Δ*CH-residual(t-1)*	0.00351***	-0.0354
	(0.00127)	(0.0420)
Frac. of Acc. Fin. Exp. Dir.(t-1)	0.00464	0.374
	(0.00487)	(0.237)

*Frac. of Acc. Fin. Exp. Dir.(t-1)*CH-residual(t-1)*	0.00983*	0.470*
	(0.00580)	(0.270)
Frac. of Non-Acc. Fin. Exp. Dir.(t-1)	0.0115*	-0.0649
	(0.00593)	(0.240)
*Frac. of Non-Acc. Fin. Exp. Dir.(t-1)*CH-residual(t-1)*	-0.000624	-0.468
	(0.00768)	(0.334)
SaleGrowth	-0.0208**	-0.133
	(0.00987)	(0.218)
LEV	-0.0276***	-0.302
	(0.00575)	(0.320)
NWC	0.000621	-2.050***
	(0.00815)	(0.416)
SIZE	0.000847	-0.0215
	(0.000633)	(0.0235)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	10,040	10,020
R-squared	0.701	0.368

When testing the relationship between board financial experience and profitability, Table 4.9 first column shows that a firm lagged industry adjusted profitability explains a significant amount of firm industry adjusted profitability with 0.572 coefficient and significance at 1% level. Looking at the firm cash holding position, it appears that the firm lagged excess cash has a negative effect on the firm profitability, consistent with Harford et al. (2008) finding, where the change in lagged excess cash holding has a positive and significant effect to firm profitability. This could be a result of holding firm cash hindering firm growth opportunities and investments and thus reducing profitability. The results on the fraction of financial-experts on board show that, even though the lagged of *Frac. of Acc. Fin. Exp. Dir* does not affect *IndAProf*, the interaction between the lagged *Frac. of Acc. Fin. Exp. Dir* and lagged *CH-residual* have a positive and significant at 10% level effect on *IndAProf*. Moreover, the *Frac. of Non-Acc. Fin. Exp. Dir* on board shows a positive and significant effect on *IndAProf*. However, their effect does not come from firm excess cash holding.

Firm profitability results, shown above, suggest that the firm excess cash holding, together with the fraction of financial experts' onboard matter in firm industry adjusted profitability. Where the excess cash holding hinders firm profitability, the fraction of non-accounting financial-experts on board enhances it. When measuring financial experience by the fraction of accounting financial-experts on board, the results suggest that accounting financial-experts on board enhance firm profitability through the use of firm excess cash holding.

4.6.5. Financial experience and market-to-book value

Cash holding can distort the value of firm through value-distorting activities or the reduction in future profitability. This study extends its analysis to cover firm overall value. Following previous approach in the previous section, the study tests how the market distinguishes between different spending choices (investment decisions and payout policies). Namely, it tests whether directors' financial experiences are related to future firm market-to-book ratio. mirroring the previous section equation; this section uses the firm industry adjusted market-to-book ratio as the dependent variable.

Model 2 in Table 4.9 shows that lagged market-to-book ratio explains a significant amount of the current market-to-book ratio with a coefficient of 0.609 and significance at 1%. Results also show that firm lagged excess cash holding decreases firm market-to-book ratio with confession of -0.136 at 10% significance level, where the change in excess cash holding has an insignificant negative relationship. Regarding board financial experience effect on firm industry adjusted market-to-book ratio, results show lagged *Frac. of Acc. Fin. Exp. Dir* and *Frac. of Non-Acc. Fin. Exp. Dir* to be positive and negative insignificance, correspondingly, to the effect on firm *IndAMB*. However, the interaction between the lagged *Frac. of Acc. Fin. Exp. Dir* and firm lagged *CH-residual* have a positively significant relationship to firm *IndAMB* at 10% level.

The firm market-to-book ratio results suggest that the firm valuation of investors does not change in the presence of financial-experts on board (accounting and non-accounting). However, investors' value excess cash, holding more in the presence of accounting financial-experts on board.

4.7. Robustness checks

In order to test the verification of the study's main results, two different robustness checks were used — first, the study control for the board of directors' composition. Two main board characteristics are widely tested in the literature to affect firm cash holding (i.e. board size and independence) (Chen and Chuang 2009; Isshaq et al. 2009; Kuan et al. 2011; Gill and Shah 2012). Table 4.10 shows that, after controlling for board size and independence, the study's main regression results hold showing a negative and significant relationship between the fraction of accounting financial-experts and firm cash holding (Model 1) and no significant relationship between the fraction of non-accounting financial-experts and firm cash holding (Model 2). Testing the linearity of the relationship between the fraction of accounting financial-experts to firm cash holding also hold (Model 3) showing non-linear relationship after breaking the fraction of accounting financial-experts into quartiles. The table shows only the coefficient of the 4th quartile to be significant at 1% level. This suggests that the real

relationship is asymmetric and the coefficient presence with the linear model is inaccurate[19].

As a second robustness check, the study used two alternative cash holding measures used in the literature. The study also tests the relationship between the fraction of financial-experts on board and the log of the ratio of cash divided by firm total assets net of cash (*CH2*) and the ratio of cash and marketable securities divided by total assets (*CH3*). Model 4 and Model 5 in Table 4.10 show that *CH2* has similar results to the study primary cash holding measure *CH*. However, the level of significance for the accounting financial-experts in Model 4 rises from 5% level to 10% level. Moreover, the model R-square slightly drops to 0.72. Using *CH3* cash holding measure, Model 6 and Model 7 also shows similar coefficient direction and significance level to the study's main models' regression. However, the R-square rises from 0.74 to 0.86, which suggests that when testing the relationship between firm cash holding and accounting financial-experience, measuring cash holding as the ratio of cash mad marketable securities divided by total assets gives a better fit model.

[19] A similar type of cut was applied on the non-accounting financial-experts (although the results are not reported in the thesis), both variables were shown to be insignificant.

Table 4. 10 Financial experience and firm cash holding (Robustness checks)

This table reports the results of OLS regressions of the relation between financial-experts and firm cash holding robustness checks. The dependent variable is the firm cash holding (*CH*), measured as the logarithm of cash and cash equivalent divided by total sale. The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir*.) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). *SIZE*: firm size measured as the log of the firm total assets. *NWC*: is the firm net working capital measured as firm working capital minus cash divided by firm assets net of cash. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CAPEXP*: is the firm capital expenditure measure divided by total assets. *CF*: is the firm cash flow divided by assets net of cash. *AQC*: is the firm acquisitions divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past four years. *DIV*: is dividends. It is a dummy variable equal to 1 if the firm paid dividend and 0 otherwise. *Indep*: is the percentage of board independent directors. *BoardSize*: is the board size calculated as the sum of directors on board. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	CH			*CH2*	*CH3*	*CH2*	*CH3*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CH(t-1)	0.731***	0.732***	0.731***				
	(0.0119)	(0.0120)	(0.0119)				
CH2(t-1)				0.714***		0.715***	
				(0.0118)		(0.0119)	
CH3(t-1)					0.767***		0.767***
					(0.0104)		(0.0104)
Frac. of Acc. Fin. Exp. Dir.(t-1)	-0.114*			-0.105*	-0.00887**		
	(0.0600)			(0.0577)	(0.00444)		
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)		0.0583				0.0644	0.00887
		(0.0702)				(0.0686)	(0.00591)
Frac. of Acc. Fin. Exp. Dir.(t-1)(1Q)			0.0181				

			(0.0178)				
Frac. of Acc. Fin. Exp. Dir.(t-1)(4Q)			-0.0489**				
			(0.0195)				
SIZE	-0.00135	-0.00133	-0.00145	-0.0332***	-0.00158***	-0.0334***	-0.00157***
	(0.00672)	(0.00667)	(0.00671)	(0.00680)	(0.000585)	(0.00675)	(0.000584)
NWC	-0.423***	-0.418***	-0.419***	-0.565***	0.0448***	-0.562***	0.0451***
	(0.0580)	(0.0579)	(0.0582)	(0.0607)	(0.00752)	(0.0606)	(0.00751)
LEV	0.115**	0.105*	0.116**	0.0240	0.0303***	0.0144	0.0295***
	(0.0584)	(0.0578)	(0.0582)	(0.0582)	(0.00569)	(0.0577)	(0.00565)
R&D	1.060***	1.060***	1.055***	0.438***	0.0952***	0.439***	0.0953***
	(0.135)	(0.136)	(0.136)	(0.132)	(0.0201)	(0.132)	(0.0201)
M/B	0.0584***	0.0577***	0.0585***	0.0817***	0.00867***	0.0811***	0.00861***
	(0.00654)	(0.00652)	(0.00654)	(0.00688)	(0.000880)	(0.00687)	(0.000876)
CAPEXP	-3.371***	-3.364***	-3.379***	-3.947***	-0.326***	-3.941***	-0.326***
	(0.266)	(0.269)	(0.267)	(0.253)	(0.0215)	(0.254)	(0.0217)
CF	0.379***	0.375***	0.379***	0.601***	0.0480***	0.597***	0.0476***
	(0.110)	(0.110)	(0.110)	(0.112)	(0.0126)	(0.112)	(0.0126)
AQC	-1.853***	-1.852***	-1.857***	-2.924***	-0.380***	-2.923***	-0.380***
	(0.127)	(0.127)	(0.127)	(0.124)	(0.0146)	(0.124)	(0.0146)
CFVOL	-0.0703	-0.0744	-0.0711	-0.0503	0.0379***	-0.0539	0.0376***
	(0.119)	(0.120)	(0.120)	(0.116)	(0.0140)	(0.117)	(0.0140)
DIV	-0.0872***	-0.0881***	-0.0872***	-0.0896***	-0.00810***	-0.0902***	-0.00817***
	(0.0204)	(0.0205)	(0.0204)	(0.0204)	(0.00171)	(0.0204)	(0.00171)
Indep(t-1)	-0.0300	-0.0360	-0.0293				

	(0.0587)	(0.0585)	(0.0586)				
BoardSize(t-1)	0.0142	0.0192	0.0148				
	(0.0341)	(0.0340)	(0.0342)				
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,734	10,734	10,734	11,498	11,548	11,498	11,548
R-squared	0.740	0.740	0.740	0.715	0.863	0.715	0.863

4.8. Additional analysis

4.8.1. Cross-sectional variation in financial-experts cash holding

To obtain an insight into the dynamic of the relationship between financial experts on board and firm cash holding, this section proceeds to investigate two cross-sectional variations in the relationship. The study introduces the effect of firm financial constraints level and corporate governance strength on the relationship and tests whether the relationship between financial experts on board and the firm cash holding heterogeneous across different financial constraints and corporate governance firms.

4.8.1.1. Financial constraint

Previous literature has, indeed, examined the effect of firm financial constraint measures on firm cash holdings. According to Han and Qiu (2007), due to precautionary reasons, financially constraint firms tend to retain more cash due to inadequate access to external capital. Moreover, Chan et al. (2013a) found that financially constraint firms have a higher marginal value of cash holding. Thus, a financial constraint makes enchanted managers retain more cash buffer compared to unconstraint firms. If financial-expert director's effect on reducing firm cash holding due to board monitoring enhancement, financial-experts on board should have more effect on reducing cash holding in financially constraint firms, in which managers have incentive to retain cash in high. Based on previous literature, the study constructs firm financial constraint measures based on three firm characteristics. First, the study used firm payout ratio. According to Fazzari et al. (1988), financially constrained firms have lower payout ratio. Following Tong (2011), the study measures the dividend payout ratio for financial constraints measure based on the ratio of total dividend and repurchase divided by total assets. The sample separation is based on the sample yearly median payout ratio. To account for endogeneity concern, a firm is assigned as constrained (unconstrained) financially if the firm lagged payout ratio is below (above) the previous year sample payout ratio median. Second, the study uses firm size (firm total assets). According to Faulkender and Wang (2006), when compared to small firms, large firms are more recognised in the market and thus it is far easier to raise money through the market to fund their investments. Third, the study applies KZ index for financial constraint level (Kaplan and Zingales 1997). Based on

five factors that arguably correlate with financially constrained firms (cash flow to total capital (negative effect), market-to-book ratio (positive effect), debt to total capital (positive effect), dividends to total capital (negative effect) and cash holdings to capital (negative effect)). Moreover, to deal with models' endogeneity concern, the study categorised firms as financially constrained (unconstrained) if the lagged firm size under (above) the t-1 sample yearly firm size median. For payout and KZ index variables, the study categorised firms as financial constrained (unconstrained) if the lagged financial constraint variable above (under) the t-1 sample yearly financial constraint variable median.

According to Table 4.11, splitting the sample into financial constraints and unconstraint firms using firm payout shows that the relationship between the fraction of accounting financial-experts on board and firm cash holding appears in financially constrained firms with 10% significance level. This implies that when firms are financial constraints, the fraction of accounting financial-experts of board have significant effect on decreasing the firm cash holding. Similar results were found using firm size as a financial constraint measure. The results indicate that the effect on accounting financial-experts show only on small firms when compared to large firms' sample. However, when measuring firm financial constraint using the firm KZ Index, the results contradict the first two measures. The results show that the effect of accounting financial-experts on the reduction of cash holding appears only on low KZ Index (unconstraint firms).

All in all, the results on the financial constraint effect of firms on the relationship between the fraction of financial-experts on board on firm cash holding is inconsistent and varies based on financial constraint measure. When measuring financial constraint based on firm size and payout ratio, the result shows that the effect of director financial-experts on limiting firm cash holding appears only in financially constraint sample firms (small firm size and low payout ratio). However, when measuring firm financial constraint level using KZ Index, the effect of financial-experts on firm cash holding appears in unconstraint firm sample (low KZ Index).

Table 4. 11 Sub-sample based on firm financial constrains

This table reports the results the relation between financial-experts and firm cash holding after splitting the sample based on the firm financial constraint level. Sample is split based on the sample median of each financial constraint measure. First and second columns, the sample split based on the firm KZ index. Third and fourth columns, the sample split based on the firm size. Fifth and sixth columns, the sample split based on the firm payout. The dependent variable is the firm cash holding (*CH*), measures as the logarithm of cash and cash equivalent divided by total sale. The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). SIZE: firm size measured as the log of the firm total assets. *NWC*: is the firm net working capital measured as firm working capital minus cash divided by firm assets net of cash. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CAPEXP*: is the firm capital expenditure measure divided by total assets. *CF*: is the firm cash flow divided by assets net of cash. *AQC*: is the firm acquisitions divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measure as is measured as the standard deviation of cash flow-to-assets net of cash for the past four years. DIV: is dividends. It is a dummy variable equal to 1 if the firm paid dividend and 0 otherwise. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Low Payout	High Payout	Small Firm Size	Large Firm Size	High KZ Index	Low KZ Index
	CH	CH	CH	CH	CH	CH
	(5)	(6)	(3)	(4)	(1)	(2)
CH(t-1)	0.709***	0.753***	0.723***	0.726***	0.727***	0.727***
	(0.0171)	(0.0131)	(0.0135)	(0.0204)	(0.0163)	(0.0145)
Frac. of Acc. Fin. Exp. Dir.(t-1)	-0.148*	-0.0819	-0.130*	-0.122	-0.0727	-0.182***
	(0.0853)	(0.0654)	(0.0757)	(0.0881)	(0.0827)	(0.0692)
SIZE	0.00710	-0.00615	0.0347*	0.00781	0.0111	-0.0168**
	(0.0109)	(0.00732)	(0.0186)	(0.0125)	(0.00966)	(0.00785)
NWC	-0.515***	-0.307***	-0.470***	-0.350***	-0.276***	-0.489***
	(0.0869)	(0.0667)	(0.0732)	(0.0858)	(0.0956)	(0.0696)
LEV	0.0391	0.192***	-0.00917	0.252***	0.0380	0.202**
	(0.0837)	(0.0725)	(0.0805)	(0.0828)	(0.0793)	(0.0808)
R&D	1.227***	0.888***	1.168***	0.877***	0.722***	1.275***

	(0.202)	(0.190)	(0.184)	(0.205)	(0.206)	(0.188)
M/B	0.0757***	0.0322***	0.0569***	0.0671***	0.0942***	0.0407***
	(0.00974)	(0.00818)	(0.00760)	(0.0118)	(0.0128)	(0.00663)
CAPEXP	-3.559***	-3.153***	-3.480***	-3.161***	-3.205***	-4.228***
	(0.347)	(0.414)	(0.341)	(0.388)	(0.304)	(0.507)
CF	0.446***	0.518***	0.522***	0.174	0.204	0.605***
	(0.164)	(0.154)	(0.151)	(0.171)	(0.156)	(0.134)
AQC	-1.935***	-1.772***	-1.939***	-1.744***	-1.946***	-1.811***
	(0.185)	(0.154)	(0.172)	(0.172)	(0.202)	(0.150)
CFVOL	-0.353**	0.394	-0.197	0.169	0.131	-0.263*
	(0.176)	(0.253)	(0.136)	(0.228)	(0.219)	(0.146)
DIV	-0.0918***	-0.0624**	-0.129***	-0.0243	-0.0798***	-0.0870***
	(0.0289)	(0.0250)	(0.0267)	(0.0290)	(0.0276)	(0.0279)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,736	5,751	5,750	5,738	6,205	5,282
R-squared	0.721	0.773	0.755	0.721	0.687	0.771

4.8.1.2. Corporate governance

According to Jensen (1986), the amount of cash held by firms can lead firms into engaging in unprofitable investments. The extensive cash buffer gives management financial flexibility and liberates them from capital market disciplinary constraints. Followed up studies showed the strength of firm corporate governance has a direct effect on the firm level of cash holding (Dittmar and Mahrt-Smith 2003; Kalcheva and Lins 2007; Harford et al. 2008). Boubaker et al. (2015) found that when governance is weak, board characteristics of strong corporate governance have a stronger influence on reducing agency conflict between enchanted managers and investors on the firm cash policy. Precisely, they found that board characteristics, such as board independence and the worth of their structure and business, help reduce firm excess cash holding. Thus, this section examines the impact of financial experts on board on firm cash holding in the present agency problem. If firms with a high fraction of accounting financial-experts reduce the firm cash holdings to mitigate agency problem, it should be expected that the effect of the fraction of financial-experts on board on firm cash holding to be more pronounced in firms with weak corporate governance.

To measure board governance strength, the sample is separated, based on board characteristics that are well established in the literature to effect board effectiveness (i.e. board independence, board size and CEO duality). For board independence and size, the study split the sample based on the variable lagged yearly median. For CEO duality, the sample was split based on the lagged CEO duality condition. Moreover, the study also measures firm corporate governance strength based on the firm entrenchment index (E-Index) proposed by Bebchuk et al. (2009). All data related to calculated E-Index were taken from Institutional Shareholder Services (ISS) database. However, since data on ISS start only from 2007, for previous years, E-Index data were taken from Harvard Lucian Bebchuk webpage[20] which covers the remainder of the sample E-Index. E-Index is constructed based on six governance provisions (staggered boards, limits to shareholder byelaw amendments, supermajority requirements for mergers, supermajority requirements for charter

[20] See http://www.law.harvard.edu/faculty/bebchuk/data.shtml

amendments, poison pills and golden parachutes). A firm can have E-Index anywhere between or equal to 0 and 6. A firm is categorised as firms with strong corporate governance if the firm E-Index is 3 or below, where weak governance are marked on firms with E-Index 4 and above.

Table 4.12 shows the main regression results after taking into consideration the firm corporate governance strength. Columns 1 and 2 show the main regression results after splitting the sample based on the fraction of independent directors on board. The regression between the fraction of accounting financial-experts and cash holding has a significant and negative coefficient for the fraction of accounting financial-experts for firms with high board independence only. This indicates that when the board is highly independent, the accounting financial-experts' influence on firm cash holding is more prominent when compared to firms with low board independence. This result is inconsistent with the study's expectation as strong board independence is considered to be a strong corporate governance mechanism; however, this result could be driven by the independence of financial-experts on board as the regression does not account for financial-experts' independence.

Moving to board size, columns 3 and 4 present the results for firms with large board size and firms with small board size. The results show that t the coefficients of the fraction of accounting financial-experts on the board are statistically significant for firms with a small board. Previous literature argues that board size is positively significant with firm cash holding (Kusnadi 2003; Lee and Lee 2009). Other studies found a negative relationship between board size and firm cash holding (Kusnadi 2011; Al-Najjar and Clark 2017). Whereas previous studies argue that small boards are found to be more effective due to the fast decision-making process involving fewer people (Jensen 1993), Harris and Raviv (2008) found that a larger board are better monitors when managers are highly enchanted. This study shows that the fraction of accounting financial-experts on board is more effective on reducing the level of firm cash holding in firms with a small board.

Table 4. 12 Sub-sample based on firm corporate governance

This table reports the results of OLS regressions of the relation between financial-experts and firm cash holding after splitting the sample based on the firm corporate governance level. Sample is split based on the sample median of each financial constraint measure. First and second columns, the sample split based on the board independence. Third and fourth columns, the sample split based on the board size. Fifth and sixth columns, the sample split based on CEO duality. The dependent variable is the firm cash holding (*CH*), measured as the logarithm of cash and cash equivalent divided by total sale. The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). *SIZE*: firm size measured as the log of the firm total assets. *NWC*: is the firm net working capital measured as firm working capital minus cash divided by firm assets net of cash. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. M/B: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CAPEXP*: is the firm capital expenditure measure divided by total assets. *CF*: is the firm cash flow divided by assets net of cash. *AQC*: is the firm acquisitions divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past four years. DIV: is dividends. It is a dummy variable equal to 1 if the firm paid dividend and 0 otherwise. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	High Independence	Low Independence	Large Board Size	Small Board Size	Duality	Non-Duality	High E-Index	Low E-Index
	CH	*CH*	*CH*	*CH*	*CH*	*CH*	*CH*	*CH*
	(7)	(8)	(9)	(10)	(11)	(12)	(11)	(12)
CH(t-1)	0.707***	0.752***	0.730***	0.709***	0.719***	0.747***	0.739***	0.711***
	(0.0152)	(0.0174)	(0.0173)	(0.0159)	(0.0150)	(0.0161)	(0.0141)	(0.0184)
Frac. of Acc. Fin. Exp. Dir.(t-1)	-0.165**	-0.111	-0.0923	-0.220**	-0.179**	-0.00913	-0.190***	0.00215
	(0.0741)	(0.0857)	(0.0853)	(0.0894)	(0.0738)	(0.0914)	(0.0716)	(0.0850)
SIZE	-0.00239	-0.00342	-0.00923	0.00792	-0.00472	0.00400	-0.000845	-0.00388
	(0.00850)	(0.00918)	(0.00955)	(0.0136)	(0.00769)	(0.0113)	(0.00795)	(0.00948)
NWC	-0.286***	-0.524***	-0.382***	-0.456***	-0.373***	-0.490***	-0.395***	-0.403***
	(0.0735)	(0.0798)	(0.0901)	(0.0816)	(0.0770)	(0.0929)	(0.0714)	(0.0856)
LEV	0.102	0.113	0.207***	0.0393	0.181**	-0.00765	0.136*	0.0756
	(0.0698)	(0.0813)	(0.0765)	(0.0907)	(0.0724)	(0.0871)	(0.0708)	(0.0878)
R&D	0.825***	1.240***	1.092***	1.229***	1.096***	0.916***	1.003***	1.162***
	(0.190)	(0.191)	(0.264)	(0.223)	(0.194)	(0.207)	(0.177)	(0.216)

M/B	0.0624***	0.0454***	0.0699***	0.0564***	0.0594***	0.0516***	0.0583***	0.0588***
	(0.00924)	(0.00859)	(0.0109)	(0.00801)	(0.00824)	(0.0101)	(0.00805)	(0.00960)
CAPEXP	-3.084***	-3.539***	-2.896***	-3.564***	-3.330***	-3.419***	-3.093***	-3.638***
	(0.362)	(0.358)	(0.403)	(0.390)	(0.299)	(0.504)	(0.335)	(0.409)
CF	0.296**	0.620***	0.262	0.651***	0.544***	0.273	0.349**	0.498***
	(0.150)	(0.172)	(0.185)	(0.150)	(0.137)	(0.191)	(0.142)	(0.162)
AQC	-1.639***	-2.077***	-1.959***	-1.831***	-2.130***	-1.474***	-1.685***	-2.210***
	(0.143)	(0.213)	(0.209)	(0.183)	(0.166)	(0.182)	(0.153)	(0.205)
CFVOL	-0.0753	-0.0860	0.169	-0.310*	-0.196	-0.0101	-0.0217	-0.224
	(0.153)	(0.176)	(0.208)	(0.166)	(0.150)	(0.162)	(0.128)	(0.228)
DIV	-0.125***	-0.0473*	-0.0499*	-0.125***	-0.0911***	-0.0877***	-0.0605**	-0.128***
	(0.0252)	(0.0278)	(0.0295)	(0.0304)	(0.0238)	(0.0306)	(0.0238)	(0.0312)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,764	5,094	4,836	4,514	7,500	3,998	6,982	4,516
R-squared	0.728	0.753	0.726	0.743	0.723	0.765	0.737	0.744

For CEO duality, columns 5 and 6 show the main regression results for the sample of firms with CEO also held the role chairman on the board and firms that split the CEO and chairman roles. The results show that the fraction of accounting financial-experts are found to be negatively significant to firm cash holding when firms have CEO duality. This is consistent with the argument that distributing cash is more important as a monitoring mechanism when CEOs are more dominant. Moreover, columns 7 and 8 show the sample split based on firm E-Index measure. The negative relationship between the fraction of accounting financial-experts and cash holding is statistically significant only for the above-median E-Index firms where managers' opportunities to expropriate private benefits are high.

To summarise, the results for the board of directors' characteristics (independence and size), the results show that the fraction of accounting financial-experts are more effective in reducing firm cash holding when the board characteristics are in line with string governance. However, for CEO duality and E-Index measure, the result of the fraction of accounting financial-experts on board are found on firms with high governance needs, firms with CEO duality and high E-Index measure.

4.8.2. Financial experience on board and the value of cash holding

This study extends the analysis to measure not only the effect of board financial experience on firm cash holding but also to measure their impact on the value of cash holding. According to Opler et al. (1999) and Kim et al. (1998), there is an optimal level of firm cash holding based on the trade-off between the benefits and costs of holding cash. However, left to their device, managers would exceed the optimal level of cash holding, avoiding control and monitoring related to external financing. This analysis is motivated by papers Faulkender and Wang (2006) and Dittmar and Mahrt-Smith (2007). Faulkender and Wang (2006) investigate the value of cash holding and how firm excess cash holding can affect firm stock retune. They examine the marginal value of cash as well as the impact of financial constraints and raise the question of why holding cash may distort firm value. Building on their argument, Dittmar and Mahrt-Smith (2007) linked the firm corporate governance to cash holding valuation. They show that the value of cash, and therefore, firm value, is partly determined by how shareholders expect the cash to be used in the presence of agency problems. Their

results show that good corporate governance enhances value of cash holding. Thus, if the fraction of financial-experts on board mitigates the firm agency problem, it should be expected that the market would value cash holding more in the presence of more financial-experts on board.

To investigate the impact of the fraction of financial-experts on board on the value of cash holding, the study applies Faulkender and Wang (2006) method:

$$r_{i,t} - R_{i,t}^{B} = \beta_0 + \beta_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_2 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \beta_3 \frac{\Delta NA_{i,t}}{M_{i,t-1}} + \beta_4 \frac{\Delta RD_{i,t}}{M_{i,t-1}} + \beta_5 \frac{\Delta I_{i,t}}{M_{i,t-1}} + \beta_6 \frac{\Delta D_{i,t}}{M_{i,t-1}} + \beta_7 \frac{C_{i,t-1}}{M_{i,t-1}} + \beta_8 L_{i,t} + \beta_9 \frac{NF_{i,t}}{M_{i,t-1}} + \beta_{10} \frac{C_{i,t}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_{11} L_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_{12} fraction\ of\ financial\ experts\ on\ baord_{i,t} + \beta_{13} fraction\ of\ financial\ experts\ on\ baord_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \varepsilon_{i,t} \quad (13)$$

Where ΔX represent the change in X from year t-1 to t. $r_{i,t}$ is the firm return over year t-1 to t. $R_{i,t}^{B}$ is Fama and French size and book-to-market match portfolio return over year t-1 to t. $M_{i,t}$ is the firm market value measured as firm share price at the end of fiscal year times shares. $C_{i,t}$ is the firm cash holding measured as the firm cash and cash equivariant. $E_{i,t}$ is firm earnings before extradentary items. $NA_{i,t}$ is the firm net assets, measured as the firms total assets net of cash. $RD_{i,t}$ is the firm research and development (the study set RD to 0 if missing). $I_{i,t}$ is the firm interest expense. $D_{i,t}$ represent the firm common dividends. $L_{i,t}$ is the firm leverage measured as the firm debt divided by debt plus market value. Firm debt is measured as the firm long and short debt. $NF_{i,t}$ is the firm new finance measured as the firm net new equity issues plus net new debt issues. $fraction\ of\ financial\ experts\ on\ baord_{i,t}$ is the firm fraction of financial-experts on board measures. The fraction of financial-experts on board is measured as the accounting financial-experts on board or the fraction of non-accounting financial-experts on board.

Firm value is measured following Daniel and Titman (1997), Grinblatt and Moskowitz (2004) and Dittmar and Mahrt-Smith (2007) as the excess return for firm *i* for fiscal year *t* minus the firm benchmark portfolio return for year *t*. The firm benchmark portfolio is measured based on Fama and French (1993) size and book-to-market portfolios. The study used the return in surplus of the portfolio benchmark to control for factors related to firm risk that could hinder the firm return and discount rate. For each firm-year observation, a firm is categorised into one of Fama and French

25 size and book-to-market portfolios based on the firm size and book-to market ratio. To determine which size and book-to-market group each firm falls into, the Fama and French 25 size and book-to-market yearly breakpoint was used. Then the matching return of Fama and French portfolio for a specific year is considered as the firm benchmark return for the matching year.

The model control variables are identical to those used in Faulkender and Wang (2006) and other studies that followed it (i.e. Dittmar and Mahrt-Smith (2007). The study control for firm-specific factors may have an effect on firm cash holding and return. These factors include the change in profitability, investments and finances. In addition to Faulkender and Wang (2006), this study adds year dummies to capture macroeconomic and time trend effects. It also adds industry fixed effect to capture undetected heterogeneity and industry effect.

Table 4.13 shows the results on the effect of the fraction of financial exports on board on the FF25 adjusted return. Model 1 shows the regression results on the fraction of accounting financial-experts on board and the integration between the fraction of accounting financial-experts on board and firm change in cash holding on firm adjusted return. The results show that, although the fraction of accounting financial-experts on board has a significant positive effect on firm adjusted return (at 1% level) and the change in firm cash holding has a significant positive effect on firm adjusted return (at 5% level), the interaction between the fraction of accounting financial-experts on board and the change in firm cash holding has an insignificant negative relationship to firm adjusted return. These results suggest that investors' value of cash holding is not determined by the presence of accounting financial-experts on board.

Model 2 shows the impact of financial-experts on board, measured as the fraction of non-accounting financial-experts on board, integration to firm change in cash holding effect on from adjusted return. Similar to Model 1 results, the regression indicates no relationship between the interaction of non-accounting financial-experts. However, the regression shows that the fraction of non-accounting financial-experts on board affects the firm adjusted return positively (at 5% level) and the change in cash holding remains positively related to the firm adjusted return (at 1% level of significance). Model 3 shows the regression results combining the different accounting financial-experts on the same regression. The main explanatory variables

remain at the same level of significance and the same magnitude with a slight change in the coefficients.

Table 4. 13 The impact of financial-experts on value of cash using return regression

This table motivated by Faulkender and Wang (2006) uses OLS return regression. The dependent variable is firm yearly Fama-French (1993) 25 size and book-to-market portfolio industry adjusted return. Δ indicates the change from previous year. C is firm cash and marketable securities. The independent variables including board financial experience, are measures as the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir*.). All other independent variables are normalised by the market value of equity (*MV*) of firm at the beginning of the year. These include interaction between financial experience variables and change in cash (*Frac. of Acc. Fin. Exp. Dir.**Δ*C/MV* and *Frac. of Acc. Fin. Exp. Dir.**Δ*C/MV*), lagged cash (*C*), change in earnings (*E*) (earnings measured as earnings before extraordinary items plus interest, differed tax and investment tax credit), assets net of cash (*NA*), R&D expenditure (RD), interest expenditure (I), common dividend (*D*), leverage (*L*) (long term debt plus current debt normalised by market value of equity plus long term debt plus current debt) and new financing (*NF*) (measured as net equity issued plus net debt issued). Standard error is estimated with clustered error at firm level. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	FF25 adj. Return	FF25 adj. Return	FF25 adj. Return
	(1)	(2)	(3)
Δ*C/MV*	1.041**	1.163***	1.186***
	(0.443)	(0.363)	(0.406)
Frac. of Acc. Fin. Exp. Dir.	0.0927***		0.0892***
	(0.0245)		(0.0246)
*Frac. of Acc. Fin. Exp. Dir.**Δ*C/MV*	-0.274		-0.0799
	(0.706)		(0.687)
Frac. of Non-Acc. Fin. Exp. Dir.		0.0655**	0.0628**
		(0.0314)	(0.0314)
Frac. of Non-Acc. Fin. Exp. Dir. *Δ*C/MV*		-1.337	-1.307
		(1.065)	(1.045)
Δ*E/MV*	1.192***	1.191***	1.190***
	(0.130)	(0.129)	(0.129)
Δ*NA/MV*	0.0938*	0.0935*	0.0941*

	(0.0518)	(0.0517)	(0.0520)
Δ*RD/MV*	2.246*	2.323*	2.274*
	(1.359)	(1.363)	(1.356)
Δ*I/MV*	-3.960**	-3.971**	-3.910**
	(1.762)	(1.733)	(1.739)
Δ*D/MV*	0.683	0.676	0.671
	(0.444)	(0.440)	(0.441)
lagged C/MV	0.603***	0.596***	0.603***
	(0.0739)	(0.0735)	(0.0734)
L	-0.326***	-0.314***	-0.324***
	(0.0421)	(0.0414)	(0.0419)
NF/MV	0.0472	0.0439	0.0444
	(0.145)	(0.144)	(0.145)
*lagged C/MV**Δ*C/MV*	2.413*	2.392*	2.377*
	(1.310)	(1.295)	(1.291)
*L**Δ*C/MV*	-0.804	-0.844	-0.829
	(0.933)	(0.928)	(0.919)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	11,258	11,258	11,258
R-squared	0.191	0.191	0.192

In summary, the results on the impact of financial-experts on the value of cash holdings show that different measures of the fraction of financial-experts on board (accounting and non-accounting) do not affect the value of cash holding; this implies that there is insufficient evidence that shareholders would value cash any differently if the board were in the presence of financial-experts on board. However, the results show that the fraction of accounting financial-experts and the fraction of non-accounting financial-experts both have a significantly positive effect on firm adjusted return.

4.8.3. Financial experience on board and the value of excess cash

The previous model mainly concentrates on the value effect due to the change in total cash and results indicate that the fraction of financial experts on board does not change investors' value of cash. Following Dittmar and Mahrt-Smith (2007), this section extends the analysis to focus on change in the level of cash rather than the total cash. In addition, it adds to the analysis of cash to reflect on the value of financial-experts on board through their influence on excess cash. Following previous literature, excess cash is defined as cash held beyond the expected "optimal" level of cash as the difference between actual cash held and predicted cash (Dittmar and Mahrt-Smith 2007; Xu et al. 2016). This study estimates the level of excess cash as the residual of cash holding regression. Following previous literature on the main determinants of the corporate level of cash holding (Opler et al. 1999; Harford et al. 2008; Frésard and Salva 2010), the cash holding regression control for firm size measured by firm total assets, leverage, growth opportunity, profitability, working capital to total assets, cash flow volatility, R&D to sale, capital expenditure to assets and acquisition to sale, the regression also accounts for year and industry fixed effect.

To determine the effect of financial-experts on the value of excess cash reserves, the study used value regression similar to the one used by Dittmar and Mahrt-Smith (2007) following the Fama and French (1998) model. For the control variables, the study used exactly the same control values employed by the Dittmar and Mahrt-Smith (2007) study, which was used to determine the impact of corporate governance on firm excess cash reserve value. A similar model was also used in other value of cash papers (Pinkowitz and Williamson 2004; Pinkowitz et al. 2006; Chan et al.

2013a). The model dependent variable is the firm value measured by the firm market-to-book ratio. As used by Fama and French (1998), the control variables are measures that mainly influence shareholders' prediction of future cash flow, which defines the firm value. These controls include current value and past and future changes of Earnings, R&D Expenses, Dividends, Interest Expense, in addition to past and future changes of firm assets and future changes of firm market value. To capture macroeconomic and time trend, the study adds the year dummy, and to control for undetected heterogeneity the study control for firm fixed effect. For each financial experience measure, the study regresses the following model:

$$\frac{MV_{i,t}}{NA_{i,t}} = \beta_0 + \beta_1 \frac{E_{i,t}}{NA_{i,t}} + \beta_2 \frac{\mathrm{d}E_{i,t}}{NA_{i,t}} + \beta_3 \frac{\mathrm{d}E_{i,t+2}}{NA_{i,t}} + \beta_4 \frac{RD_{i,t}}{NA_{i,t}} + \beta_5 \frac{\mathrm{d}RD_{i,t}}{NA_{i,t}} + \beta_6 \frac{\mathrm{d}RD_{i,t+2}}{NA_{i,t}} + \beta_7 \frac{D_{i,t}}{NA_{i,t}} + \beta_8 \frac{\mathrm{d}D_{i,t}}{NA_{i,t}} + \beta_9 \frac{\mathrm{d}D_{i,t+2}}{NA_{i,t}} + \beta_{10} \frac{I_{i,t}}{NA_{i,t}} + \beta_{11} \frac{\mathrm{d}I_{i,t}}{NA_{i,t}} + \beta_{12} \frac{\mathrm{d}I_{i,t+2}}{NA_{i,t}} + \beta_{13} \frac{\mathrm{d}NA_{i,t}}{NA_{i,t}} + \beta_{14} \frac{\mathrm{d}NA_{i,t+2}}{NA_{i,t}} + \beta_{15} \frac{\mathrm{d}MV_{i,t+2}}{NA_{i,t}} + \beta_{16} fractionof\ financial\ experts\ directors_{i,t} + \beta_{17} XCash_{i,t} + \beta_{18} fractionof\ financial\ experts\ directors_{i,t} \times \frac{XCash_{i,t}}{NA_{i,t}} + Year\ Dummies + Firm\ Fixed\ Effects + \varepsilon_{i,t} \quad (14)$$

From the model above, dX signifies the change in X from t-2 to t. $MV_{i,t}$ is the firm market value measured as firm share price at the end of fiscal year times shares. $NA_{i,t}$ is the firm net assets, measured as the firm's total assets net of cash. $E_{i,t}$ is firm earnings before extradentary items. $RD_{i,t}$ is the firm research and development (the study set RD to 0 if missing). $D_{i,t}$ represent the firm common dividends. $I_{i,t}$ is the firm interest expense. $C_{i,t}$ is the firm cash holding measured as the firm cash and cash equivariant. $fractionof\ financial\ experts\ directors_{i,t}$ is the firm fraction of financial-experts on board measures. The fraction of financial-experts on board is measured as the accounting financial-experts on board or the fraction of non-accounting financial-experts on board. $\frac{XCash_{i,t}}{NA_{i,t}}$ is the firm excess cash measured as the main cash regression residuals; however, cash is measured as cash holding to net assets.

Table 4. 14 The impact of financial-experts on excess cash using market-to-book regression

This table shows the result for the value regression. The dependent variable is the market to assets ratio. Independent variables include board financial experience measured as the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). Firm cash position is the unexplained cash holding and the change in their cash position. That is, the residual from regressing cash holding on firm specific characteristics representing the firm excess cash holding. The cash holding regression control for firm size, leverage, growth option, profitability, ratio of working capital to assets, four years cash flow volatility, R&D to sale, capital expenditure to assets, and acquisition to sale. The cash holding regression also controls for industry and year effects. Δ*2* indicates the two-year future change. Where Δ*L2* is two years lagged change. CH is firm cash and marketable securities. All other independent variables are normalised by the firm net asset (*NA*) measured as firm assets net of cash. These include interaction between financial experience variables and cash residuals *Frac. of Acc. Fin. Exp. Dir.*CH-residual* and *Frac. of Acc. Fin. Exp. Dir.*CH-residual*), change in earnings (*E*) (earnings measured as earnings before extraordinary items plus interest, differing tax and investment tax credit), assets net of cash (*NA*), R&D expenditure (*RD*), interest expenditure (*I*), common dividend (*D*) and leverage (*L*) (long term debt plus current debt normalised by market value of equity plus long term debt plus current debt). Standard error is estimated with clustered error at firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	MV/NA	*MV/NA*	*MV/NA*	*MV/NA*	*MV/NA*	*MV/NA*
	(1)	(2)	(3)	(4)	(5)	(6)
CH-residual	0.0736**	0.0208	0.0527	0.0774**	0.0191	0.0446
	(0.0306)	(0.0339)	(0.0378)	(0.0337)	(0.0293)	(0.0386)
Frac. of Acc. Fin. Exp. Dir.	0.274		0.266	0.00630		-0.00679
	(0.176)		(0.176)	(0.163)		(0.163)
*Frac. of Acc. Fin. Exp. Dir.*CH-residual*	-0.103		-0.124	-0.0535		-0.103
	(0.0883)		(0.0913)	(0.106)		(0.108)
Frac. of Non-Acc. Fin. Exp. Dir.		0.187	0.168		0.319	0.322
		(0.216)	(0.216)		(0.197)	(0.197)
*Frac. of Non-Acc. Fin. Exp. Dir. *CH-residual*		0.176	0.194		0.315*	0.336**
		(0.156)	(0.159)		(0.165)	(0.166)
E/NA	5.041***	5.050***	5.045***	6.095***	6.083***	6.084***
	(0.515)	(0.516)	(0.516)	(0.581)	(0.581)	(0.581)
Δ*2 E/NA*	-0.0537	-0.0540	-0.0547	0.0943	0.0947	0.0923

	(0.231)	(0.231)	(0.231)	(0.260)	(0.259)	(0.259)
Δ*L2 E/NA*	2.358***	2.358***	2.359***	3.001***	2.998***	2.996***
	(0.300)	(0.300)	(0.300)	(0.356)	(0.355)	(0.355)
RD/NA	8.396***	8.414***	8.414***	7.494***	7.484***	7.477***
	(1.105)	(1.107)	(1.106)	(0.855)	(0.854)	(0.856)
Δ*2 RD/NA*	2.866	2.891	2.900	4.851***	4.905***	4.908***
	(1.777)	(1.776)	(1.777)	(1.643)	(1.636)	(1.638)
Δ*L2 RD/NA*	7.974***	7.981***	7.973***	8.863***	8.850***	8.844***
	(1.112)	(1.112)	(1.109)	(1.437)	(1.432)	(1.432)
D/NA	5.673***	5.653***	5.688***	11.11***	11.13***	11.12***
	(1.612)	(1.616)	(1.612)	(1.573)	(1.582)	(1.579)
Δ*2 D/NA*	0.0158	0.0194	-0.00115	-0.188	-0.219	-0.197
	(1.419)	(1.425)	(1.422)	(1.495)	(1.501)	(1.497)
Δ*L2 D/NA*	3.148***	3.150***	3.146***	6.798***	6.768***	6.767***
	(1.091)	(1.095)	(1.091)	(1.386)	(1.386)	(1.386)
I/NA	-18.19***	-18.07***	-18.20***	-21.73***	-21.62***	-21.59***
	(4.170)	(4.155)	(4.155)	(3.008)	(2.980)	(2.989)
Δ*2 I/NA*	-1.692	-1.881	-1.687	-0.169	-0.263	-0.287
	(2.214)	(2.243)	(2.208)	(2.868)	(2.853)	(2.864)
Δ*L2 I/NA*	-14.24***	-14.27***	-14.23***	-13.07***	-13.04***	-13.05***
	(2.647)	(2.660)	(2.650)	(3.217)	(3.226)	(3.226)
Δ*2 NA/NA*	0.0483	0.0514	0.0465	0.221**	0.221**	0.220**
	(0.0734)	(0.0736)	(0.0734)	(0.0915)	(0.0915)	(0.0917)
Δ*L2 NA/NA*	0.607***	0.607***	0.606***	0.494***	0.494***	0.495***
	(0.0570)	(0.0571)	(0.0569)	(0.0752)	(0.0753)	(0.0752)
Δ*2 MV/NA*	-0.201***	-0.201***	-0.201***	-0.0193	-0.0201	-0.0199
	(0.0209)	(0.0208)	(0.0209)	(0.0272)	(0.0272)	(0.0272)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	No	No	No

Firm FE	No	No	No	Yes	Yes	Yes
Observations	8,994	8,994	8,994	9,014	9,014	9,014
R-squared	0.828	0.827	0.828	0.597	0.598	0.598

Table 4.14 shows the impact of the fraction of financial-experts on board on the market value of excess cash holding. Model 1 shows the effect of the fraction of accounting financial-experts on board on the value of firm excess cash holding and to be consistent with previous analysis. This analysis starts with year and industry fixed effects. The regression shows that firm *CH-residual* has a positive and significant (at 5% level) effect on firm *MV/NA*. However, the *Frac. of Acc. Fin. Exp. Dir.* and the integration between the *Frac. of Acc. Fin. Exp. Dir.* and firm *CH-residual* has no significant effect on firm *MV/NA*. Moving to Model 2, the results of the non-fraction of accounting financial-experts on board effect on the value of firm excess cash holding also indicate no significant relationship between the *Frac. of Non-Acc. Fin. Exp. Dir.* on board and the firm *MV/NA* and no relationship between the integration between the *Frac. of Non-Acc. Fin. Exp. Dir.* and firm *CH-residual* and firm *MV/NA*. However, when controlling for financial-experts measured by the *Frac. of Non-Acc. Fin. Exp. Dir.* (Model 2) rather than *Frac. of Acc. Fin. Exp. Dir.* (Model 1), the *CH-residual* became insignificant to firm *MV/NA*. Model 3 combines the two fractions of financial-experts' measures (accounting and non-accounting financial-experts) and found similar results to Model 1 and Model 2 with an insignificant effect of *CH-residual* on firm *MV/NA*.

Models 4, 5 and 6 duplicate Models 1, 2 and 3, respectively, but followed Dittmar and Mahrt-Smith (2007) use of fixed effect (year and firm fixed effect). Even though Model 4 shows a similar result to Model 1, Model 5, the *Frac. of Non-Acc. Fin. Exp. Dir* interaction with firm *CH-residual* appears to be positively significant to firm *MV/NA* at 10% level. When combining the two financial-experience measures in Model 6, the relationship between the interaction between *Frac. of Non-Acc. Fin. Exp. Dir.* and *CH-residual* and firm *MV/NA* is significant at 5% where the interaction between *Frac. of Acc. Fin. Exp. Dir.* and *CH-residua* remain insignificant. The *Frac. of Acc. Fin. Exp. Dir.* and *Frac. Of Non-Acc. Fin. Exp. Dir.* variables show an insignificant relation to firm *MV/NA* in all models.

In sum, when measuring the effect of fraction of accounting financial-experts on board effect on the market value of excess cash holding, the results show no significant effect for the fraction accounting and non-accounting financial-experts on board. Interestingly, when controlling for firm fixed effect instead of industry fixed

effect, the fraction of non-accounting financial-experts appears to be positively significant on market valuation of excess cash holding, suggesting that there is no substantial evidence to support the argument that investors would value excess cash holding any differently in the presence of accounting financial-experts on board and very weak evidence to support the argument that investors would value excess cash more in the presence of non-accounting financial-experts on board.

4.9. Conclusion

As the trend on the level of cash holding shows increasingly worldwide, firm top management make daily strategic decisions about the appropriate way to manage firm cash reserves and whether to distribute it to shareholders, use it internally, use it for external acquisition or continue holding their extra cash. The presence of a conflict of interest between managers and investors renders the board of directors a crucial corporate governance mechanism to ensure managers make their cash holding decision in line with shareholders' interest. Following previous studies on the role of corporate governance mechanism on firm level of cash holding, this study investigates the dynamics of the effect of different board directors' financial expertise on the level of firm cash holding. The study then expands its investigation by undertaking several additional analyses as to how the relationship between board financial experience and firm cash holding affect firm investment decisions, payout policies, firm profitability, the value of cash holding and the value of excess cash holding.

The main results of this part of the study shows that the fraction of accounting financial-experts has an inverse relationship to firm level of cash holding. After testing the linearity of the relationship, results show that the relationship was driven from the high fraction of accounting financial-experts decreasing the firm level of cash holding but not from a low fraction of accounting financial-experts on board increasing firm cash holding. This finding is in line with the study hypothesis, driven from the traditional financial theory flexibility hypothesis on managers preference to retain firm earnings to have the flexibility of financing investments without the need to raise money from the capital market, which employs its external monitory over managers. The study finding denotes the role of the fraction of accounting financial-experts on board on enhancing firm monitoring over managers' decisions related to cash management. However, the results do not hold when financial-experience is measured

by the directors' non-accounting financial experience. The main findings of the study are robust to controlling for additional board characteristics and different cash holding measures.

On a cross-section analysis based on board financial constraint level and corporate governance strength, the study shows that firms financial constraint effect on the relationship between the fraction of financial-experts on board on firm cash holding is inconsistent and varies based on the based on financial constraint measure. Based on firm size and payout ratio, the result shows that the effect of director financial-experts on limiting firm cash holding appears in financial constraint firms (small firm size and low payout ratio). However, using KZ Index, the effect of financial-experts on firm cash holding appears in financially unconstraint firm (low KZ Index). Regarding corporate governance effect on the relationship between the fraction of financial-experts on board and firm cash holding, the results for board of directors' characteristics (independence and size) shows that the fraction of accounting financial-experts is more effective in reducing firm cash holding when the board characteristics are in line with strong governance (more independent small boards). However, for CEO duality and E-Index measure, the result of the fraction of accounting financial-experts on board is found in firms with high governance needs (firms with CEO duality and high E-Index measure).

Further analysis on how the fraction of financial-experts on board influences investment and payout decision in relation to firm excess cash holding suggests that there is insufficient evidence that the fraction of accounting and non-accounting financial-experts has an effect on the firm industry adjusted capital expenditure, R&D or acquisition. Results also suggest that the interaction between different financial experiences and excess cash holding has no effect on firm industry-adjusted investment decisions. Moreover, results suggest that firms do not differ in their payout policies based on the fraction of financial-expert directors on board. However, the fraction of accounting financial-experts explains a great deal of the increase in dividend payments from firm excess cash holding. Moreover, the study tested the effect of the interaction between financial-experts on board and firm change in excess cash holding on firm profitability and market-to-book ratio and found the accounting financial-experts' ability to enhance firm profitability and market-to-book ratio from

the firm changes in excess cash holding. Moreover, following the Faulkender and Wang (2006) model on the value of cash holding, results suggest that shareholders would not value cash holding any differently in the presence of financial-experts on board. Moreover, applying the Dittmar and Mahrt-Smith (2007) model on the value of excess cash holding shows that there is no evidence to support the argument that investors would value excess cash holding any differently in the presence of accounting financial-experts on board and very weak evidence to support the argument that investors would value excess cash more in the presence of non-accounting financial-experts on board. The next chapter, however, provides an empirical examination and discussion of the effect of financial expertise of directors on firm payout policy.

Chapter 5: Financial experience and payout policy

5.1. Introduction

Ever since Miller and Modigliani (1961) established the ground of their famous "**irrelevance of dividend" theory**, studies have shown a deep interest in firms' payout policies. Since Miller and Modigliani's theory was based on the assumption of a perfect market, researchers have attempted to ease this assumption through the introduction of many market imperfections. According to the agency theory, the agency problem is one major market imperfection where managers and investors share a conflict of interest and thus, managers may adopt a payout policy that not necessarily maximises shareholders' wealth. To alleviate the agency problem, firms apply appropriate corporate governance mechanism. The role of effective internal corporate governance on applying a disciplinary mechanism through influencing firm payout policy has drawn full attention in the literature. According to previous studies, the board of directors is considered one of the most effective corporate governance mechanisms and therefore, the board of directors' attributes plays a primary role in mitigating agency problem. This chapter addresses the effect of financial-experts on board on firm payout policy in the US market.

According to prior literature, one of the main determinants of firm payout policy is their internal governance applied by the effectiveness of the board of directors' dynamic. Chen et al. (2017) found that the fraction of gender on board influences firms to pay more dividends. Other researchers, such as Hu and Kumar (2004), Setia-Atmaja (2010) and Yarram and Dollery (2015) found that highly independent boards would influence the distribution of the free cash flow in the form of dividends. Other studies also highlighted a positive relationship between board size and dividend payout (Jiraporn and Ning 2006; Abor and Fiador 2013; Yarram and Dollery 2015). This study investigates the board demography, focusing on directors' financial experience, to influence the firm payout policy.

Given that payout policy is a strategic plan used by directors where they decide on whether to distribute cash to shareholders or accrue it for future investment. According to agency theory, dividend policy can be used as a mechanism to mitigate agency problem. According to Jensen (1986), dividend limits managers' ability to

misuse excess cash. Moreover, Easterbrook (1984) argues that dividend payment reduces managers and shareholders' agency problem through subjecting the firm to external market analysis. According to Jiraporn et al. (2011), dividend payment is positively associated with governance quality.

Board of directors is another governance mechanism to control agency problem. According to Boumosleh and Cline (2015), to maximise firm value, a control system of combining governance mechanism and dividend policy is needed. According to John and Knyazeva (2006), a firm with strong internal and external government are found to pay less dividend. Moreover, Hu and Kumar (2004) studied management entrenchment and payout policy and found that firms with less control over managers pay more dividend. Additionally, Jiraporn and Ning (2006) propose that firms pay higher dividends when shareholder rights are more suppressed. However, other studies argue based on a positive relationship between firm corporate governance strength and payout policies. For example, Adjaoud and Ben-Amar (2010) found that firms with stronger corporate governance pay more dividend. Moreover, Jiraporn et al. (2011) findings imply that investors in firms with strong corporate governance are more able to force managers to distribute cash through dividend payout. Considering the conflicted result on the dynamic of the relationship between firm corporate governance and payout policy, this study aims to shed light on the role played by financial experts on board on firm payout policy.

Literature on corporate governance shows that directors with financial experience on board can affect board monitoring and control (McMullen and Raghunandan 1996; Xie et al. 2003; Abbott et al. 2004; Agrawal and Chadha 2005; DeFond et al. 2005; Güner et al. 2008; Fernandes and Fich 2009; Huang et al. 2014). In this matter, previous studies show that directors with financial experience provide better financial reporting (McDaniel et al. 2002; Mangena and Pike 2005; Mangena and Tauringana 2007), forecasting (Karamanou and Vafeas 2005), earning management (Klein 2002; Bédard et al. 2004), finance and investment policies (Güner et al. 2008) and firm performances (Davidson et al. 2004; Fernandes and Fich 2009; Minton et al. 2011; Francis et al. 2012a; Minton et al. 2014). Thus, given the significance of financial-experts on corporate finance and investment decisions and the role played by them in corporate governance (Güner et al. 2008), unwrapping how

financial-experts on board affect dividend policy is undoubtedly necessary. This study aims to contribute to the growing literature on the role of financial-experts on firm corporate decisions; mainly, how financial-experts affect the firm decisions related to firm payout policy. The research question highlighted in this chapter asks whether directors' financial experience affects firm monitoring policy. Specifically, it explores whether having financial-expert directors affects firm long-term payout policy.

This part of the study empirically test the impact of the fraction of financial experts (i.e. the fraction of accounting financial-experts and the fraction of non-accounting financial-experts) on board on payout policy using three different payout measures (payout to assets ratio, payout to net income and payout per share). This chapter also explores the cross-sectional heterogeneity in the relation in question across firms with different firm setting based on their corporate governance strength and financial constraints position. To further understand the dimension of financial-experts' effect on firm payouts, this study investigates the effect of financial-experts on different payout policies (dividend or repurchase). Firms make the decision on the firm payout structure. The reasoning behind why firms pay dividend has been a puzzle for more than five decades. Miller and Modigliani (1961) argue that in a perfect capital market (assuming the absence of tax) the dividend should have no effect on investors and firms. However, according to Black (1976), it is difficult to justify why firms pay dividends in the presence of firm tax. Moreover, stock repurchase offers firms and investors considerable flexibility and tax advantages (Guay and Harford 2000; Skinner 2008). When comparing payout policies, John and Knyazeva (2006) found that, when corporate governance is weak, firms are less likely to adopt a repurchase policy. Instead, firms are more likely to adopt dividend policy or mixed dividend-repurchase policy. Bhabra and Luu (2015) argue that, as repurchases are not mandatory in nature when compared to dividends, enchanted managers pay shareholders in the pre-commit payout policy rather than repurchasing stocks. Following the rise of firm repurchase activities at the expense of dividend policy (Fama and French 2001; Hsieh and Wang 2009), this study investigates the effect of financial-experts on the firm payout policy chosen.

Based on a sample of 952 firms (10,060 firm-year observations) for the period between 1999 and 2017, this part of the study finds that, in the case of enhanced corporate governance, through the appointment of financial-experts on board, financial-experts show their ability to influence managers to payout more to shareholders. However, this effect was found for financial-experts with accounting-related financial-experience and not found for financial-experts that obtained their experience through supervising accounting financial-experts (CEO and presidents). The study's main findings are robust to controlling for board composition and excluding utility firms. This study's main result is in line with the complement hypothesis. In particular, stronger corporate governance allows shareholders to minimise the amount of cash available to managers to minimise the misuse of free cash flow through the form of payouts**.**

The results also show that the effect of accounting financial-experts on increasing firms payout is more prominent in firms with weak corporate governance mechanism regarding high E-Index, CEO duality and large board size measures. However, the results are mixed based on board independence depending on the payout measure. Moreover, results show that high financially constrained firms, where top management tend to hold more cash, accounting financial-experts on board play a significant role in increasing the firm payout level. This is in line with the study main argument that directors' financial experience enhances board monitoring, reducing agency conflict of interest.

This study shows that the fraction of accounting financial-experts on board not only increases firm payout level, but is more likely to pay shareholders in the form of repurchase. Given the investors' expectation of cumulative dividend payments, stock repurchase offers firms and investors significant flexibility and tax advantages. However, the flexibility of the firm repurchase option, arguably, cause self-interested managers to be driven to avoid repurchasing stocks. The financial-expert directors' influence on distributing free cash flow via non-pre-committed shareholder payments emphasises their role as financial-experts on board in enhancing board effectiveness.

The study contributes to the finance literature on the effectiveness of financial-expert directors on board in numerous ways. First, this study adds to the literature on the effect of board composition on firm payout. Previous literature mainly focuses on

the role of board independence, board gender diversity, the board size, and CEO duality (Schellenger et al. 1989; Al-Najjar and Hussainey 2009; Byoun et al. 2016; Chen et al. 2017). To the best of the researcher's knowledge, this study is the first to link the financial experience of directors to the firm's payout level and different payout policies (dividend and repurchase). Second, results challenge the SOX Act definition of financial experience[21], which includes "supervising" employees with financial reporting responsibilities. Directors with non-accounting financial experience failed to have a similarly positive effect when compared to directors with prior accounting financial experience. Finally, the study results offer empirical justification to the increasing calls by policymakers and academics for more financial-expert directors on boards to improve the monitoring role in board of directors.

The structure of this chapter is as follows. Succeeding this introduction, the second section describes the theoretical background. The third section describes the study literature review and hypothesis development. The fourth section describes the sample, the variables used in this study and the empirical model. The fifth section reports the study findings. The final section concludes the chapter.

5.2. Hypothesis development

Determining firm payout policy has long held the interest of economic scholars due to several market imperfections. Modern corporations face the existence of information asymmetry and agency conflict of interest between managers and investors. Thus, the topic of what determines the firm payout policy remains a puzzle.

Also, the main purpose of corporate governance is to provide financial profit to firm investors. Firm shareholders acquire financial gain through dividend payments or capital gain. Previous literature mainly focuses on agency theory when explaining dividend policy behaviour in the presence of an organisational conflict of interest (Rozeff 1982; Easterbrook 1984; Jensen 1986). The agency theory argues that shareholder prefers payments when the conflict of interest is high. Agency theory emphasise the need to unite the interest of shareholders to managers, which could be affected by board financial-expertise. Board of directors makes the final decisions

[21] This study financial experience measured were taken according to the SOX Act definitions of financial experience (see section 2.2.3.)

regarding investment of the firm extra fund. Financial-experts on board have received growing attention within corporate governance literature. According to Güner et al. (2008), there is a direct impact of directors' financial-experience on the firm's financial and investment policies. Financial-experts on board can help mitigate agency problem by easing the conflict of interest between managers and shareholders through improving their monitoring role (Byrd and Mizruchi 2005; Harris and Raviv 2008), improve the quality of information provides to board (Kirkpatrick 2009) and enhance their ability to advise on their investment decisions (Dionne and Triki 2005; Huang et al. 2014).

According to Rozeff (1982), firm agency cost is the main determinant of firm payout policy, arguing that managers may not always approve payout policy as alien to shareholders' value maximisation; instead, managers prefer to retain earnings to avoid external financial cost and additional monitoring. Thus, in the presence of the conflict of interest between managers and investors, to avoid managers' misuse of retained earnings, investors value payout more (White 1996). The main elements within the agency cost are the cost of monitoring managers, the cost of information asymmetry between shareholders and managers, and the cost of managers' risk-averse behaviour. In the presence of wide ownership structure, the cost of monitoring managers increases. To avoid monitor shareholders bearing all the cost of monitoring while other investors benefit from the monitoring cost, shareholders prefer to apply internal (board of directors) together with external monitoring mechanism through the payments of dividend. Increasing dividend payments expose managers to capital market monitoring, which managers attempt to avoid (Baker 2009).

Other agency costs arise from information asymmetry between shareholders and managers. Literature shows that financial-experts on board have a direct link to firm information environment. Agrawal and Chadha (2005) found that the probability of restating earning is lower in firms with financial-expert directors on their board of directors or audit committee. Harris and Raviv (2008) claim that, among independent directors, those with financial experience have a lower cost in obtaining information relating to the complexity of a financial transaction and risk-taking and are, thus, more capable of effectively monitoring executive management. The corporate board is often criticised for lacking financial-experts on board (Kirkpatrick 2009). Financial-experts

on board can offer a better understanding of financial information (Kirkpatrick 2009) and better financial advisers to management (Francis et al. 2015). As La Porta et al. (2000) argue, enhancing firm information environment reduces agency cost between managers and shareholders.

Additional agency cost arising from the conflict of interest between managers and shareholders is the managers' risk-averse behaviour. Invested in their interest, managers' wealth is entangled with the firm's and, thus, unwilling to increase firm risk-taking for the benefit of maximising only shareholders' wealth. Investing in a less risky project would hinder shareholders' long-term investment profit (Easterbrook 1984). According to Minton et al. (2011), financial expertise on board is related to firm risk-taking. They argue that independent financial-experts, with a fiduciary responsibility to shareholders, understand the nature of the residual equity claims and will commonly prefer additional risk-taking. They add that financial-experts' familiarity and understanding of complex financial instruments allow them to participate in higher-risk activities. The results of Minton et al. (2014) have come to support these findings. It suggests that the presence of financial-experts on board could influence the amount of retained earnings encouraging the firm to undertake more investments reducing dividend payments. Study findings by Casey and Theis (1997) and Dickens et al. (2002) support the idea that firm risk-taking is a determinant to the firm dividend payments.

In line with the managers' risk-averse behaviour, to avoid additional risk, managers would also reduce the debt-to-equity ratio, relying mainly on firm internal financing, reducing firm dividend payments (Easterbrook 1984). In line with the resource dependence theory, the board has the primary role of provision resource, which implies the board ability to add resources to the firm (Hillman and Dalziel 2003). Previous studies showed that directors' financial-experience have a direct influence on the firm debt ratio. Stearns and Mizruchi (1993) found that money investors, bankers, and money market bankers on board are related to firm short borrowing. Byrd and Mizruchi (2005) show that bankers on board affect increasing firm debt ratio, enhancing firm external financing to ease the need for internal financing. Thus, it can be argued that financial experts would increase firm payouts.

In their prominent study, La Porta et al. (2000) presented two agency models of dividend, the "*outcome*" and the "*substitute*" agency dividend models. The outcome agency dividend model argues that dividends are the result of strong monitoring to shareholders' right. However, according to the "substitute" agency dividend model, dividends are a substitute mechanism for mitigating relatively more pronounced agency problem and a higher risk of expropriating by insiders. In respect of the second model, firms pay dividends to establish their reputation. In a country comparison level, La Porta et al. (2000) findings support the agency dividend outcome model, showing that countries with high shareholders' protection are associated with high dividend payments. Moreover, Hwang et al. (2013) study shows that corporate governance has a significant positive relationship with the firm dividend payout ratio. Kumar (2006) maintained that corporate governance mechanism has a direct effect on the firm dividend policy measured by ownership structure. Whilst, Hwang et al. (2013) documented that enhancing firm corporate governance improves payment policy over time. Jiraporn et al. (2011) tested the firm overall corporate governance quality influence on dividend policy. They found that firms with better corporate governance face a higher propensity to pay dividends and, moreover, dividend payer firms tend to have higher dividend payment. They argue that investors of strong corporate governance firms can influence managers to release more cash through dividend payments; thus, cutting the amount of cash to be misused by opportunistic managers. In support of the outcome hypothesis, this study proposes the following two hypotheses:

However, through the literature, some studies show results contradicting the outcome model. In support of the substitute model, according to Baker (2009), in regard to the agency problem, different firm setting affects shareholders' expectations of firm payouts. He shows that strong corporate governance and investment opportunity eases shareholder pressure over managers to pay dividends. Chae et al. (2009) finding illustrates that improving firm corporate governance results in dividend payments' reduction when external financial constraint is high. According to findings by Jiraporn et al. (2011) and Renneboog and Szilagyi (2008), there is a negative relationship between firm corporate governance and dividend payments. They argue that weak corporate governance pays higher dividends to attract investors, confirming

substitution theory. Following the substitute view, the study proposes two potential hypotheses:

Hypothesis 1: There is a relationship between the fraction of accounting financial-expert directors on board and payout policy.

Hypothesis 2: There is a relationship between the fraction of non-accounting financial-expert directors on board and payout policy.

5.3. Data and variables construction

5.3.1. Sample and scope

This study analyses a sample of publicly-traded non-financial companies of Standard & Poor's (S&P) 500 (LargeCap), S&P 400 (MidCaps), S&P 600 (SmallCap) for the period between 1999 and 2017. The period was chosen based on BoardEx availability data.

Table 5. 1 Selection criteria for the sample

Analysis of sample attrition at different stages of sample.

Criterion	# of firms
All firms in the S&P 1500	1500
Financial and Utilities firms	208
Missing data firms	340
Sample (excluding finance and Utilities firms and missing data firms)	952

Board attributes and directors' education and characteristics were retrieved from the BoardEx database, a business intelligence dataset that includes over 350,000 business leaders' profiles across 19 countries. All financial information used to calculate dividend policy and other financial variables from COMPUSTAT North America. Industry classification is formed based on Fama-French 48 industry classification. To reduce the effect of outliers, all continuous variables are winsorised at the 1st and 99th percentiles. The end sample size, after excluding financial- and missing-firms is 952 firms and 10,060 firm-year observations.

5.3.2. Variable definition

This section presents the study's dependent and control variables. The discussion focusses first on the firm dividend policy measures, followed by the definitions of control variables measures providing information about all the variables used in this study.

5.3.2.1. Payout policy measures

This study uses different variables to measure firms' payout policy to be consistent with early literature. Motivated by Chae et al. (2009) and Grullon and Michaely (2002) payout measures, other than payments in the form of dividends, firms can pay their earnings to shareholders in the form of share repurchase. Therefore, to measure the real amount of firms' payout, the study uses the sum of share repurchase and cash dividends paid in a year. Following Bagwell and Shoven (1989), Berger et al. (1997), Dittmar (2000) and Chae et al. (2009), firm repurchase dollar volume is measured using COMPUSTAT Purchase of Stock item. The study uses three different payout ratios: first, the sum of repurchase and dividend divided by firm total assets (RDA); second, the sum of repurchase and dividend scaled by the firm net income (RDNI); third, the sum of repurchase and dividend per share.

5.3.2.2. Control variables

This study controls for factors that have been proved in the literature to influence firm dividend payment. These factors include growth opportunity, profitability, firm size, firm risk, firm leverage and firm free cash flow.

Market-to-book (M/B): Firm finance requirement for growth opportunity is one factor seen to influence dividend payout. Firms with higher growth opportunity are able to retain their earning (Chang and Rhee 1990) and pay lower dividend compared to firms with low-growth opportunity (Rozeff 1982; Lloyd et al. 1985; Dempsey and Laber 1992; Jensen et al. 1992; Moh'd et al. 1995; Holder et al. 1998; Ho 2003). Following other studies (Harford 1999; Wu 2004; Chae et al. 2009), the study uses the *M/B* ratio as a proxy for growth opportunity. M/B ratio measured as the firm market value divided by firm assets net of cash.

Profitability (PRO): profitability has a positive effect on payouts. As profitability increases, the amount of free cash flow rises. Investors will then demand higher dividend payment to reduce the amount of free cash flow in management hands, reducing agency cost (Jensen and Meckling 1976). Firm profitability is measured as the firm return on equity ratio, computed as net income dividend by firm total equity.

Firm Size (SIZE): firm size has a negative relationship with growth opportunity. Thus, free cash flow is disgorged as dividend to decrease agency cost (Lloyd et al. 1985). Studies show that, compared to small firms, large firms distribute higher amount of dividend (Eddy and Seifert 1988; Jensen et al. 1992; Redding 1997; Fama and French 2001). Therefore, it is expected firm size would have a positive effect on dividend payout. *SIZE* is measured as the natural logarithm of the firm total assets.

Firm Leverage (LEV): According to Ferreira and Vilela (2004), highly levered firms are monitored more than low levered firms and highly pressured to distribute free cash flow. However, other studies contradict this finding and establish a negative effect between leverage and dividend payment, concluding that low leveraged firms tend to have high dividend payment (Al-Najjar and Belghitar 2011). This study measures *LEV* as total debt/shareholder equity.

Free cash flow (FCF): the firm ability to pay dividend mainly relies on the availability of free cashflow. Previous studies establish a positive effect free cash flow had on firm payouts (i.e. Bradley et al. (1998); La Porta et al. (2000). This study measures *FCF* as the amount of cash a company hold for current activities and growth after deducting its liabilities. *FCF* is calculated as (net profit-change in fixed assets – change in net-working capital)/ total assets.

Cash flow volatility (CFVOL): a firm cash flow sensitivity was found to be a major determinant for firm payout policy. According to Bradley et al. (1998) found payout ratios are lower for firms with higher cash-flow volatility. Moreover, Chay and Suh (2009), found, using worldwide firm-level data, that cash-flow uncertainty is a critical cross-sectional determinant of corporate payout policy. They also argue that the impact of cash-flow uncertainty on dividends is generally stronger than the impact

of other potential determinants of payout policy. The measure used in the study for *CFVOL* is the standard deviation of the cash flow for the past 10 years.

Research and development *(R&D)*: according to Bah and Dumontier (2001) as firm research and development intensive rise, firms exhibit significant lower dividend payment levels. The study control for *R&D* expenses computed at firm research and development expenses to firm total sale.

Cash holding (*CH)*: the decision of payout depends mainly on the level of cash held by the company. Dobetz and Grüninger (2006) and Al-Najjar and Belghitar (2011) documented a positive relationship between firm cash holding and firm payment. *CH* is calculated as firm cash and short term investment divided by assets net of cash and short term investment.

Financial constraint *(KZ)*: literature shows the firms' ability to finance investment affects their payout decision. Studies found a negative relationship between the firm financial constraints measured and level of payout (Deangelo and Deangelo 1990; Chae et al. 2009; Chen and Wang 2012; Pathan et al. 2016). As firm financial constraint rises, the firms are less likely to pay dividends in order to invest in financial value-creating investments. To measure firms' financial constraint level, the study applies the KZ index measure (Kaplan and Zingales 1997). Based on five factors that arguably correlate with financial constraint firms (cash flow to total capital (negative effect), market-to-book ratio (positive effect), debt to total capital (positive effect), dividends to total capital (negative effect) and cash holdings to capital (negative effect)), the KZ index is measured using the following equation:

$$KZ\ Index = (-1.001909 * \frac{Cash\ Flows}{K}) + (0.2826389 * Q) + (3.139193 * \frac{Debt}{Total\ Capital}) + (-39.3678 * \frac{Dividends}{K}) + (-1.314759\ x\ \frac{Cash}{K}) \quad (15)$$

Where is: *Cash flow* is the end of the year income before extradentary items plus total depreciation and amortisation. *K* is the beginning of the year property plant and equipment. *Q* is the beginning of the year market capitalisation plus total shareholder's equity minus book value of common equity minus deferred tax assets, all normalised by total shareholder's equity. *Debt* is the beginning of the year total long term debt

plus notes payable plus the current portion of long term debt. *Dividends* is the beginning of the year total cash dividends paid.

Corporate governance strength (*E-Index*): the relationship between corporate governance and dividend payment is strongly established in the literature. As corporate governance strength and firm shareholder protection increases induce, firm are forced to pay more dividend (outcome hypothesis) (Mitton 2004; Bae et al. 2012). However, other studies argue that firms with weak corporate governance pay more dividend to establish their reputation and compensate minority shareholders (substitute hypothesis) (Knyazeva 2008; Jiraporn et al. 2011). This study measures firm corporate governance strength using the firm *E-Index* of Bebchuk et al. (2009). *E-Index* was measured using the sum of six binary variables indicating whether the firm has the following: staggered board, limitation on amending byelaws, limitation on amending the charter, supermajority, golden parachute and poison pill[22].

Tangible assets (*PPE*): the study also controls for tangible assets measures as property, plant and equipment scaled by firm total assets. According to Harris and Raviv (1991), tangible assets tend to be easier for outside investors to value. Leary and Michaely (2011) argue that firm tangible assets reduce firm external finance costs, increasing their dividend payments.

Other control variables: the study variables may change over the study period. To control for the unobserved heterogeneity effect of time and firm, the study controls for year and industry. Year fixed effect controls for the time trends of financial expertise on board and firm payouts, where the industry fixed effect reflects factors related to a specific industry that could influence the determinants of both; appointing directors with financial experience and firm payouts. Industry fixed effect is added based on Fama-French 48 industry classification.

[22] The E-Index is taken from the website of Lucian Bebchuk for sample until 2006 and calculated following Bebchuk, L. et al. 2009. What Matters in Corporate Governance? *The Review of Financial Studies* 22(2), pp. 783-827. for the rest of the years.

5.4. Methodology

5.4.1. Empirical model

To empirically test the impact of the fraction of financial experts on board on payout policy, the study estimates the following model:

$$Payout_{i,t} = \beta_0 + \beta_1 Fraction\ of\ financial\ experts\ directors_{i,t-1} + \gamma\ Controls_{i,t-1} + Year\ Dummy + Industry\ Dummy + \varepsilon_{i,t} \quad (16)$$

Where $Payout_{i,t}$is the firm payout dependent variables (payout to assets ratio, payout to net income and payout per share). $Fraction\ of\ financial\ experts\ directors_{i,t}$ is represented by two financial expertise measures (the fraction of accounting financial-experts on board and the fraction of non-accounting financial-experts on board. $Controls_{i,t}$ is the study set of control variables. The model also includes year and industry dummies to control for the unobserved heterogeneity effect of time and firm. Given that the study variables may change over the study period, the year fixed effect controls for the trends of financial expertise on board and dividend policy where the industry fixed effect to control for factors related to the specific industry that could influence the determinants of the firm dividend policy and the fraction of financial experts on board.

5.6. Descriptive analysis

This section provides the study descriptive analysis through a summary of the sample characteristics and the study variable summary statistics and correlation matrix.

5.6.1. Sample characteristic

Table 5.2 shows the number of firm observations spread through the years and industry. Panel A shows the number of firms appearing in each year and the fraction of yearly observations from the whole sample. Based on data availability, the table shows that firm observation numbers increase through the years until 2016. Firm observations start with only 2 firms in year 1999 with a dramatic increase the following years, 54 firms in year 2000 (0.5% of the sample size) and 291 firms in year 2001 (2.9% of the sample size) until it reaches 889 firms in the year 2016 (8.8% of the

sample size). At the time of the study, the data available for the year 2017 were only 30 firms (only 0.3% of the sample size)[23].

Table 5. 2 Descriptive statistics

The sample contains 952 firms from S&P 1500 non-financial. There are 10,060 firm-year observations over the period from 1999 to 2017. The Fama-French 10-industry classification is used for Panel B.

Panel A: number of observations spread through the years

Year	Number of firm obs.	% of firm obs. from the total sample.
1999	2	0.0%
2000	54	0.5%
2001	291	2.9%
2002	348	3.5%
2003	372	3.7%
2004	456	4.5%
2005	487	4.8%
2006	575	5.7%
2007	610	6.1%
2008	642	6.4%
2009	684	6.8%
2010	707	7.0%
2011	720	7.2%
2012	759	7.5%
2013	780	7.8%
2014	809	8.0%
2015	845	8.4%
2016	889	8.8%
2017	30	0.3%
Total	10060	100%

On Table 5.3 Panel B shows the sample firms and firm-year observations spread through industries using the Fama-French 10 industry classification. The table shows that the manufacturing and technology industries have the most firm appearances in the sample with 177 firms for each industry, representing 18% of all firms in the sample. The least number of industries with firms in the sample are durable

[23] The sample start in 1999 based on BoardEx data availability. Even though year 1999 and 2017 have a substantial lower firm observations excluding this year have no effect on the study main results or robust checks. However, these results are not reported in this study.

and telecommunications with only 31 firms, respectively (3% of sample firms) and 21 (2% of sample firms). A similar distribution is also seen in the firm-year observations. Manufacturing and technology industry appears to have the most firm-year observations with 17% and 15% of all sample firms; correspondingly where firm-year observations from durable and telecommunications remain at the sample fraction of the sample, durable at 3% and telecommunications at 2%. Other industries' firm-year observation rank as following: others, shops, health, utility and energy. A similar ranking was also seen in the number of firms in the sample.

Table 5. 3 Descriptive statistic (continue)

Panel B: Sample industry firm distribution based on Fama-French 10 industry classification.

Industry	No. of firms obs.	%of firms	No of firm-year obs.	% of firms
Durables	31	3%	327	3%
Energy	47	5%	544	5%
High Tech	177	18%	1,746	15%
Healthcare	92	10%	862	7%
Manufacturing	177	18%	1,966	17%
Non-Durables	69	7%	814	7%
Other	142	15%	1,455	13%
Shops	139	14%	1,356	12%
Telecom	21	2%	197	2%
Utilities	57	6%	793	7%
Total	952	99%	10,060	87%

5.6.2. Summary statistic and correlation

This section provides the study variable summary statistic and correlation matrix. Table 5.4 shows the study dependent, independent and control variables mean, median, standard deviation and the 5th, 25th, 75th and 95th percentile. The study employs three different payout measures. The *RDA* mean is 5.1% (median 2.6%) with a standard deviation of 0.065; the *RDNI* mean 65.1% (median 51.4%) with a standard deviation of 1.226; and *RDPS* mean $1.672 (median $0.96) with a standard deviation of 2.146. As the dependent variables are ratios, scaled by firm assets, net income and total shares, they may have an extensively large value when demonstration is low. For example, a firm might pay a large amount of cash when its assets are low. As justified

Table 5. 4 Summary statistics

This table reports the results of OLS regressions of the relation between financial-experts and firm payout. The dependent variables are the firm payout variables; repurchase and dividend to total assets (*RDA*), repurchase and dividend to net income (*RDNI*) and repurchase and dividend per share. The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). *SIZE*: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. *PPE*: is the net property, plant and equipment divided by total assets. *E-Index*: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. *ROE*: return on equity measured as firm net income divided by market value of equity. *CH* is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. All continues variables are winsorised at the bottom and top 1 % levels.

Variable	Obs.	Mean	Std. dev	5%	25%	Median	75%	95%
Panel A: Payout (dependent variables)								
RDA	10,060	0.051	0.065	0.000	0.008	0.026	0.070	0.188
RDNI	10,060	0.651	1.226	-0.197	0.065	0.514	0.977	2.290
RDPS	10,060	1.672	2.146	0.000	0.251	0.960	2.166	5.987
Panel B: Financial Experience measures (independent variables)								
Frac. of Acc. Fin. Exp. Dir.	10,060	0.317	0.182	0.077	0.182	0.300	0.429	0.667
Frac. of Non-Acc. Fin. Exp. Dir.	10,060	0.153	0.131	0.000	0.071	0.125	0.222	0.400
Panel C: Firm financial information (control variables)								
SIZE	10,060	8.035	1.583	5.750	6.817	7.877	9.079	10.775
CH	10,060	0.208	0.344	0.004	0.028	0.089	0.233	0.812
LEV	10,060	0.227	0.169	0.000	0.089	0.223	0.335	0.523
R&D	10,060	0.035	0.074	0.000	0.000	0.000	0.031	0.183
M/B	10,060	3.238	3.669	0.881	1.598	2.400	3.776	8.872
PPE	10,060	0.302	0.237	0.034	0.112	0.226	0.453	0.777

E-Index	10,060	3.597	1.276	1.000	3.000	4.000	4.000	5.000
KZ	10,060	-6.212	14.209	-26.533	-6.803	-1.903	0.397	1.761
CFVOL	10,060	0.045	0.054	0.008	0.017	0.029	0.051	0.142
ROE	10,060	0.033	0.093	-0.086	0.030	0.048	0.065	0.110

by Chae et al. (2009), this could be the reason for why payout variables have a higher measure of mean than median.

Moving on to the study explanatory variables (fraction of directors with financial experience), Table 5.4 Panel B shows that on average, firm in the sample has 31.7% of *Frac. of Acc. Fin. Exp. Dir.* starting at 7.7% at 5th percentile reaching 66.7% at 95th percentile. For the *Frac. of Non-Acc. Fin. Exp. Dir.,* on average, firms in the sample have 15.3% of their directors on board with previous non-accounting financial-experience starting at 0% at 5th percentile reaching 40% at 95th percentile. Accounting and non-accounting financial-experience on board variables have a median (standard deviation) of 30% (0.182) and 12.5% (0.131) respectively. Data implies that on average firms have more directors with financial experience related to accounting than financial experience related to previous CEO or president role.

Panel C on Table 5.4 presents a list of the sample firms financial information (control variables) summary static. Sample firms on average have a *SIZE* of 8.035 standard deviation of 1.583) a slightly higher than the US firms reported by Chen et al. (2017) which might be due to sampling period difference. On average, the ample firms *CH* is 20.8%, 22.7% *LEV*, 3.5% *R&D,* 30.2% *PPE* very similarly to variables reported by Chen et al. (2017). However, the study sample firms have a higher *TobinQ* (mean 3.238) and weaker corporate governance with higher *E-Index* (3.597). On average, the sample firms have -6,.212 *KZ*, 0.045 *CFVOL* and 3.3% *ROE*.

Table 5.4 and Table 5.5 reports the study variable correlation matrix. The correlation matrix provides an understanding of the relationship between the study dependent and independent variables. It also identifies a potential multicollinearity problem that might lead to an incorrect estimate. Spearman (Pearson) correlation coefficients are shown below (above) the diagonal. Several features of the data are worth highlighting. The relationship between the *Frac. of Acc. Fin. Exp. Dir.* and *Frac. of Acc. Fin. Exp. Dir.* with the study dependent variable (*RDA*, *RDNI* and *RDPS*) show a positive magnitude to and significant at 1% level, in line with the research hypothesis that the presence of financial-experts on board has a positive influence on their payout policy. The correlation matrix also shows that all control variables are

Table 5. 5 Correlation matrix

This table presents the study variables correlation matrix. Spearman (Pearson) correlation coefficients are shown on below (above) the diagonal. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6	7	8
RDA	1	0.450***	0.675***	0.072***	0.048***	0.047***	-0.030***	0.019**
RDNI	0.768***	1	0.401***	0.065***	0.038***	0.097***	-0.090***	-0.045***
RDPS	0.853***	0.749***	1	0.185***	0.073***	0.330***	-0.148***	-0.107***
Frac. of Acc. Fin. Exp. Dir.	0.098***	0.109***	0.185***	1	0.222***	0.189***	-0.028***	-0.048***
Frac. of Non-Acc. Fin. Exp. Dir.	0.044***	0.047***	0.065***	0.246***	1	0.020***	0.009	-0.048***
SIZE	0.116***	0.190***	0.382***	0.135***	-0.012	1	-0.259***	-0.189***
CFVOL	-0.128***	-0.219***	-0.300***	-0.034***	0.018*	-0.282***	1	0.379***
R&D	0.086***	-0.012	-0.052***	-0.007	-0.047***	-0.137***	0.268***	1
LEV	-0.116***	0.024**	0.119***	0.143***	0.032***	0.429***	-0.184***	-0.207***
CH	0.116***	-0.035***	-0.102***	-0.002	-0.007	-0.292***	0.374***	0.442***
ROE	0.212***	0.233***	0.326***	0.009	-0.040***	0.187***	-0.179***	-0.195***
KZ	-0.422***	-0.259***	-0.231***	-0.053***	0.005	0.178***	-0.118***	-0.399***
E-Index	-0.011	0.001	0.050***	0.270***	0.100***	-0.037***	0.009	0.050***
M/B	0.363***	0.223***	0.224***	0.045***	0.026***	0.018*	0.006	0.216***
PPE	-0.079***	0.002	0.054***	-0.060***	0.021*	0.227***	-0.208***	-0.450***

Table 5. 6 Correlation matrix (continue)

	9	10	11	12	13	14	15
RDA	-0.046***	0.052***	0.131***	-0.252***	-0.019**	0.241***	-0.099***
RDNI	0.063***	-0.036***	0.135***	-0.096***	0.011	0.067***	-0.021***
RDPS	0.146***	-0.110***	0.173***	-0.073***	0.059***	0.127***	0.003
Frac. of Acc. Fin. Exp. Dir.	0.144***	-0.060***	0.018**	-0.020**	0.271***	0.031***	-0.025***
Frac. of Non-Acc. Fin. Exp. Dir.	0.058***	-0.012	0.014*	-0.024***	0.104***	0.015*	0.027***
SIZE	0.359***	-0.316***	0.081***	0.155***	-0.045***	-0.013*	0.212***
CFVOL	-0.115***	0.371***	-0.134***	-0.170***	0.032***	0.038***	-0.164***
R&D	-0.205***	0.616***	-0.182***	-0.239***	0.007	0.128***	-0.299***
LEV	1	-0.309***	-0.079***	0.163***	0.017**	-0.026**	0.190***
CH	-0.476***	1	-0.095***	-0.384***	-0.028***	0.119***	-0.302***
ROE	0.032***	-0.143***	1	-0.039***	-0.003	0.035***	0.011
KZ	0.435***	-0.527***	-0.045***	1	0.003	-0.138***	0.394***
E-Index	0.031***	0.007	-0.013	-0.014	1	-0.050***	-0.014*
M/B	-0.068***	0.192***	-0.114***	-0.304***	-0.090***	1	-0.104***
PPE	0.259***	-0.453***	0.115***	0.705***	-0.045***	-0.167***	1

significantly correlated to *RDPS* dependent variable at the 1% level. However, for *RDA* all explanatory variables, other than *E-Index*, are significantly rated at 1% level. Moreover, other than *R&D*, *E-Index* and *PPE*, *RDNI* also shows a significant relationship to the explanatory variable. Spearman (Pearson) correlation coefficients state that there is no multicollinearity problem between the study main variables of the study [24].

5.7. Regression results

In this section, the main regression results are provided on the relationship between the fraction of financial-experts on board and firm different payout measures to test the study main hypotheses using OLS regression with year and industry dummies. Table 5.6 contains the result for the regression explaining payout policy measured by repurchase and dividend over total assets, repurchase and dividend over net income and repurchase and dividend per share. The nine regressions vary in terms of financial expertise measure and payout policy measure. The first three regressions test different financial-expert measures (the fraction of accounting financial-expert directors and the fraction of non-accounting expert directors), measures to firm payout, measured by the sum of firm repurchase and dividend by firm total asset. Regressions 4, 5 and 6 duplicate the first three regressions using the sum of firm repurchase and dividend divided by firm net income as the firm payout measure. The last three regressions repeat the first three regressions using the sum of firm repurchase and dividend per share as the firm payout measure. The study also considers endogeneity concerns. The relationship may be subject to reverse effect between dividend policy and financial-experts on board. That is, high payout policy firms may appoint or attract more financial experts directors instead of financial-experts on board increase firm payouts. Alternatively, the results may be driven by unobservable variables that affect firm payout policy and the appointment of financial-experts on board. To control for endogeneity, consider the study lagged all explanatory variables (independent and

[24] Another way to assess multicollinearity problem is through calculating the variance inflation factor (VIF) for all independent variables. The VIF results show that the maximum VIF takes the value of 1.83, where the lowest VIF is 1.05. These values are below the 10 rule of thumb threshold provided by Chatterjee, S. and Hadi, A. S. 2015. *Regression analysis by example*. John Wiley & Sons.. This indicated that multicollinearity issue is unlikely to be present in this study

controls) to ensure that the relationship appears in the regression as a result from previous year financial-experts on board to present year payout policy.

Table 5.6 Model 1 tests the influence of the fraction of accounting financial-experts on board and board payout ratio measured by the sum of firm repurchase and dividend by the firm assets controlling for firm financial information, financial constraint and corporate governance variables with year and industry dummy variables. After controlling for firm lagged financial information variables, financial constraint position and firm corporate governance strength, Table 5.6 shows that the fraction of accounting financial-experts appear to have a positive influence on firm payout to assets ratio. That is, higher fraction of accounting financial-experts on board would encourage firm to distribute more cash to shareholding minimising the amount of cash available to management. This finding is in line with the study main hypothesis that firm accounting financial-experts have a positive relationship to firm payout policy.

Before moving to the second model, the first model shows that the fraction of firm payout to total assets is positively influenced by firm size. That is, the larger the firm size is, the more likely they will increase their payout. The relationship between firm size and payout were found to be statistically significant at 1% level. This is in line with the arguments of previous studies. Firm size has a negative relationship with growth opportunity. Thus, to decrease agency cost, free cash flow is disgorged as dividends (Lloyd et al. 1985). Moreover, studies also show that, compared to small firms, large firms distribute more payout (Eddy and Seifert 1988; Jensen et al. 1992; Redding 1997; Fama and French 2001). Consistent with previous literature of the Bradley et al. (1998) and Chay and Suh (2009) model shows that firm with high cash holding volatility, higher risk, reduces their payout. Higher cash flow uncertainty drives firms to reduce their level of payout to shareholders. Moreover, as predicted by the study and following previous studies (Bah and Dumontier 2001), R&D appear to have a negative coefficient to firm payout. However, the relationship is not statistically significant at any level. Additionally, it appears that *LEV* has a negative effect on payouts. The relationship between *LEV* and payout appear to be statistically significant at 1% level. This is consistent with previous literature showing that low levered firms tend to have high dividend payment (Fenn and Liang 2001; Deangelo et

al. 2004; Setia-Atmaja 2010; Al-Najjar and Belghitar 2011; Jiraporn et al. 2011; Sharma 2011; Pucheta-Martínez and Bel-Oms 2015; Byoun et al. 2016). In respect of firms cash holding, as expected and argued by previous studies (Dobetz and Grüninger 2006; Al-Najjar and Belghitar 2011), firm *CH* has a positive coefficient in relation to firm payout. Moreover, the effect that *CH* has on payout appears to be statistically significant at 1% level.

Table 5.6 Model 1 also reveals that firm profitability measured by ROE has a positive relationship with dividend payout. This relationship is significant at 1% level, as is in line with the findings of previous studies that as profitability increases the amount of free cash flow also increases. Investors will then demand higher dividend payment to reduce the amount of free cash flow in management hands, reducing agency cost (Jensen and Meckling 1976). Measured by firm M/B ratio, the table shows that firm growth opportunity is positive, and significant at 1% level, related to firm payout. This result is inconsistent with previous literature, arguing that firms with higher growth opportunity are able to retain their earning (Chang and Rhee 1990) and pay lower dividend (Rozeff 1982; Lloyd et al. 1985; Dempsey and Laber 1992; Jensen et al. 1992; Moh'd et al. 1995; Holder et al. 1998; Ho 2003). Moreover, Model 1 also shows a positive coefficient on PPE, which was in line with the study prediction. However, the relationship appears to be insignificant at any level. As for corporate governance strength and firm financial constraint variables, Model 1 shows a negative relationship between firm financial constraint level and payout and found a negative coefficient for both variables, in line with the study prediction. However, only the KZ index relationship is significant to 1% level. Almost all control variables remain at the same coefficient sign through all models and the same significance level.

Table 5. 7 Financial experience and firm payout

This table reports the results of OLS regressions of the relation between financial-experts and firm payout. The dependent variables are the firm payout variables; repurchase and dividend to total assets (*RDA*) , repurchase and dividend to net income (*RDNI*) and repurchase and dividend per share (*RDPS*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir*.) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir*.). *SIZE*: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. *PPE*: is the net property, plant and equipment divided by total assets. *E-Index*: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. *ROE*: return on equity measured as firm net income divided by market value of equity. *CH* is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Expected signs	*RDA*			*RDNI*			*RDPS*		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Frac. of Acc. Fin. Exp. Dir. (t-1)	+	0.0148**		0.0146**	0.238**		0.237**	0.778***		0.770***
		(0.0066)		(0.0066)	(0.0984)		(0.0982)	(0.245)		(0.244)
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)	+		0.0077	0.0071		0.0436	0.0337		0.304	0.272
			(0.00998)	(0.0099)		(0.130)	(0.129)		(0.328)	(0.324)
SIZE (t-1)	+	0.0054***	0.0056***	0.0055***	0.0667***	0.0690***	0.0668***	0.473***	0.481***	0.474***
		(0.0009)	(0.0009)	(0.0009)	(0.0105)	(0.0105)	(0.0106)	(0.0329)	(0.0326)	(0.0327)
CFVOL (t-1)	-	-0.0519**	-0.0526**	-0.0524**	-1.290***	-1.296***	-1.293***	-1.804***	-1.834***	-1.824***
		(0.0226)	(0.0227)	(0.0227)	(0.328)	(0.327)	(0.328)	(0.634)	(0.639)	(0.640)
R&D (t-1)	-	-0.0362	-0.0360	-0.0361	-0.276	-0.273	-0.276	-1.646**	-1.637**	-1.645**
		(0.0343)	(0.0344)	(0.0344)	(0.418)	(0.418)	(0.418)	(0.741)	(0.747)	(0.743)

LEV (t-1)	(-/+)	-0.0612***	-0.0594***	-0.0611***	-0.494***	-0.465***	-0.493***	-0.812***	-0.715**	-0.806***
		(0.0084)	(0.0085)	(0.0084)	(0.0966)	(0.0973)	(0.0964)	(0.301)	(0.307)	(0.302)
CH (t-1)	+	0.0178***	0.0177***	0.0178***	0.160**	0.160**	0.160**	0.251*	0.250*	0.250*
		(0.0067)	(0.0067)	(0.0066)	(0.0807)	(0.0810)	(0.0806)	(0.142)	(0.144)	(0.142)
ROE (t-1)	+	0.0422***	0.0425***	0.0421***	0.8460***	0.8520***	0.8460***	2.4820***	2.4970***	2.4790***
		(0.0060)	(0.0060)	(0.0059)	(0.0992)	(0.0998)	(0.0991)	(0.242)	(0.242)	(0.241)
KZ (t-1)	-	-0.0007***	-0.0007***	-0.0007***	-0.0036***	-0.0036***	-0.0036***	-0.0069**	-0.0070**	-0.0070**
		(0.00013)	(0.0001)	(0.0001)	(0.0012)	(0.0013)	(0.0012)	(0.0029)	(0.0030)	(0.0030)
E-Index (t-1)	(-/+)	-0.0011	-0.0010	-0.0011	0.0033	0.0043	0.0035	0.0240	0.0278	0.0250
		(0.000996)	(0.0001)	(0.0010)	(0.0128)	(0.0129)	(0.0128)	(0.0335)	(0.0333)	(0.0333)
M/B	-	0.0040***	0.0040***	0.0040***	0.0190***	0.0194***	0.0190***	0.0698***	0.0713***	0.0698***
		(0.0005)	(0.0005)	(0.0005)	(0.0034)	(0.0034)	(0.0034)	(0.0119)	(0.0120)	(0.0119)
PPE	+	0.0022	0.0020	0.00205	0.0301	0.0284	0.0294	-0.393	-0.401	-0.398
		(0.0075)	(0.0075)	(0.00745)	(0.105)	(0.106)	(0.105)	(0.255)	(0.257)	(0.254)
Year FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		10,060	10,060	10,060	10,060	10,060	10,060	10,060	10,060	10,060
R-squared		0.257	0.256	0.257	0.065	0.064	0.065	0.239	0.236	0.239

Model 2 on Table 5.6 has the same set of variables and controls as Model 1. However, it tests the effect of non-accounting financial-experts' relationship to payout policy. The results show that the fraction of non-accounting financial-experts has no significant effect on firm payout policy with a minor drop on R-squared compared to Model 1(from 0.257 to 0.256). The third regression combines the two financial experience variables (the fraction of accounting financial-experts and the fraction of non-accounting financial-experts on board) and found similar results to regressions 1 and 2 in terms of coefficient signs, values and significance level. R-squared increase slightly to 0.257, matching the first regression R-squared.

Table 5.6 regressions 4 to 6 replicate the first three regressions from the table. However, the fraction of financial-experts on board was regressed to the firm payout policy measured by the sum of firm repurchase and dividend scaled by firm net income. Both accounting and non-accounting financial-experts' coefficients increase (from 0.0148 to 0.238 and from 0.0077 to 0.0436, respectively) with the same significance level. However, regressions R-squared drops from 0.257 to 0.065, which indicates that when the payout is scaled by total assets instead of net income, the regression shows a better fit. Moreover, regressions 7 to 9 replicated the previous regressions; however, using payout per share. Results also hold in terms of coefficient sign and significance. However, the significance level increases for accounting financial-experts from 5% to 1% showing a stronger relationship. The model R-squared came closer to when scaling payout by firm total assets (0.236 compared to 0.257), signifying a similar model fit.

The positive relationship between the fraction of accounting financial-experts on firm and firm payout policy indicates that, in the case of enhanced corporate governance, through the appointment of accounting financial-experts on board, accounting financial-experts compel managers to pay more dividend to shareholders. This result is in line with the compliment hypothesis, which argues that stronger corporate governance allows shareholders to minimise the amount of cash available to managers preventing the misuse of excess cash. These findings are in line with La Porta et al.'s (2000) findings that better firm corporate governance enhances shareholder protection. However, when measuring board financial experience by the fraction of non-accounting financial experts on board, results show no indication of

any influence on firm payout policy. This finding suggests that enhancing board of directors' composition through the appointment of non-accounting financial-experts does not have the same efficiency as the appointment of accounting financial-experts.

5.8. Robustness checks

In addition to using different payout measures to ensure the robustness of the study results, this section provides two additional robustness tests. First, the study adds some extra controls to control for other board characteristics that were proven in the literature to affect board monitoring. Second, the study adjusts the sample used in the main regression and exclude utility firms (SIC codes 4900–4999), as these firms are subject to regulations and have different characteristics of their accounting information, their payout policies and the access to external financing.

Table 5.7 shows the results to main regression robust tests. The first three regressions use the same set of the study main regressions on Table 5.6; however, the regressions also control for other board of directors' characteristics; that is, board size, board independence and CEO duality. Previous studies widely investigate the relationship between the board of directors and payout policy and found that the board of directors' composition affects firm payout policy (Schellenger et al. 1989; Adjaoud and Ben-Amar 2010; Abor and Fiador 2013; Pucheta-Martínez and Bel-Oms 2015; Yarram and Dollery 2015; Chen et al. 2017). Models 1, 2 and 3 show the effect of the fraction for financial-experts on board to the firm payout decision after controlling for board composition. For the first three regressions, sample size drops from 10,060 to 9,403. Regression 1 shows that even when board composition is controlled, the fraction on accounting financial-experts has a significant positive relationship to firm payout scaled by total assets and coefficient slightly increases from 0.0146 to 0.0167 with the same level of significance, whereas the non-accounting financial-experts remain insignificant with the same coefficient sign. The model R-squared slightly increases from 0.257 to 0.264, indicating a better model fit. Regression 2 also shows that when testing the relationship between board fraction of financial exerts with payout policy scaled by net income, controlling for board composition, the results stand with a slight increase with model R-squared from 0.065 to 0.069 and accounting financial-experts' coefficient from 0.237 to 0.263. Moreover, the non-accounting experts also remain insignificant with the same coefficient sign. Regression 3 shows

the relationship between the fraction of financial-experts on board and firm payout per share after controlling for board composition and the main results stand. The accounting financial-experts' coefficient slightly rises from 0.77 to 0.792 and the R-squared went from 0.239 to 0.244, indicating a slightly better fit model.

Regressions 4, 5 and 6 show the robustness checks after excluding Utilities industry. After excluding utility firms, the sample size drops from 10,060 to 9,267. Replicating the study main regressions, regression 4 shows similar results to the study main findings on the relationship between the fraction of financial-experts on firm payout to total assets. However, the accounting financial-experts' coefficient rises from 0.0146 to 0.0175 and the model R-squared slightly decreases to 0.247, from 0.257. The non-accounting financial-experts remain insignificant. Regression 5 also shows similar results to the study main regression on the fraction of financial-experts' effect on firm payout to net income. The fraction of accounting financial-experts' coefficient rises from 0.257 to 0.275 and the model R-squared also increased slightly from 0.065 to 0.068. The non-accounting financial-experts remain insignificant. Final regression on the study robust test also confirms the study main results showing a strong relationship between board accounting financial-experts and firm payout per share. After excluding utility firms, the accounting financial-experts' coefficient increases from 0.77 to 0.866 indicating that when utility firms are excluded from the sample, accounting financial-experts on board appear to have a greater influence on firm payout decisions.

To summarise the study's robustness tests, the study main findings are robust to controlling for board composition and excluding Utilities firms. Models show a higher relationship between accounting financial-experts and payout decisions and better model fits when controlling for board composition. Moreover, when excluding utility firms from the sample, models show a very similar fit with slight increase when testing the relationship using payout to net income and payout per share. Also, when excluding utility firms, the relationship between the fraction of accounting financial-experts and payout appears to be stronger. Regarding the fraction on non-accounting financial-experts, the robust tests are in line with the main study regression results, as the non-significant relationship between non-accounting financial-experts and firm payout decision appears in all robust measures.

Table 5. 8 Financial experience and firm payout (Robustness checks)

This table reports the results of OLS regressions of the relation between financial-experts and firm payout robust test. The dependent variables are the firm payout variables; repurchase and dividend to total assets (*RDA*), repurchase and dividend to net income (*RDNI*) and repurchase and dividend per share (*RDPS*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir*.) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). SIZE: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D:* is the firm research and development expenses divided by sale. M/B: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. *PPE*: is the net property, plant and equipment divided by total assets. *E-Index*: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. *ROE*: return on equity measured as firm net income divided by market value of equity. *CH*: is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. *BoardSize*: in the log of sum of directors on board. *Indep*: is board independence, measured as the fraction on independent directors to the sum of directors on board. *Duality*: is the CEO duality, a dummy variable that takes 1 if the firm CEO and chairman positions are held by the same person and 0 otherwise. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Board Characteristics			ExUtility		
	RDA	*RDNI*	*RDPS*	*RDA*	*RDNI*	*RDPS*
	(1)	(2)	(3)	(1)	(2)	(3)
Frac. of Acc. Fin. Exp. Dir. (t-1)	0.0167**	0.263***	0.792***	0.0175**	0.275**	0.866***
	(0.00664)	(0.0985)	(0.240)	(0.00731)	(0.108)	(0.268)
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)	0.0108	0.127	0.313	0.00744	0.0289	0.322
	(0.00979)	(0.133)	(0.330)	(0.0108)	(0.141)	(0.351)
SIZE (t-1)	0.00330***	0.0278**	0.397***	0.00582***	0.0695***	0.488***
	(0.00103)	(0.0138)	(0.0356)	(0.000922)	(0.0110)	(0.0345)
CFVOL (t-1)	-0.0487**	-1.363***	-1.658***	-0.0510**	-1.295***	-1.724***
	(0.0236)	(0.281)	(0.627)	(0.0230)	(0.332)	(0.645)

R&D (t-1)	-0.0436	-0.298	-1.790**	-0.0359	-0.268	-1.670**
	(0.0352)	(0.429)	(0.754)	(0.0344)	(0.419)	(0.747)
LEV (t-1)	-0.0624***	-0.512***	-0.795***	-0.0642***	-0.546***	-0.885***
	(0.00852)	(0.0992)	(0.301)	(0.00860)	(0.0982)	(0.308)
CH (t-1)	0.0199***	0.206**	0.299**	0.0179***	0.162**	0.264*
	(0.00688)	(0.0806)	(0.147)	(0.00665)	(0.0807)	(0.143)
ROE (t-1)	0.0405***	0.824***	2.454***	0.0416***	0.815***	2.412***
	(0.00595)	(0.103)	(0.243)	(0.00620)	(0.102)	(0.250)
KZ (t-1)	-0.000673***	-0.00317***	-0.00631**	-0.000679***	-0.00358***	-0.00654**
	(0.000128)	(0.00121)	(0.00293)	(0.000128)	(0.00123)	(0.00289)
E-Index (t-1)	-0.00183*	-0.00730	-0.00223	-0.00131	0.00221	0.0187
	(0.000993)	(0.0130)	(0.0336)	(0.00107)	(0.0136)	(0.0354)
M/B (t-1)	0.00401***	0.0192***	0.0705***	0.00397***	0.0191***	0.0705***
	(0.000465)	(0.00349)	(0.0121)	(0.000466)	(0.00340)	(0.0120)
PPE (t-1)	0.00151	0.0465	-0.434*	0.00295	0.0710	-0.351
	(0.00745)	(0.105)	(0.251)	(0.00814)	(0.112)	(0.276)
BoardSize (t-1)	0.0221***	0.409***	0.671***			
	(0.00512)	(0.0796)	(0.181)			
Indep (t-1)	0.00723	0.0137	0.530***			
	(0.00572)	(0.0973)	(0.200)			
Duality (t-1)	-0.000400	0.0360	0.164**			
	(0.00228)	(0.0355)	(0.0711)			
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,403	9,403	9,403	9,267	9,267	9,267
R-squared	0.264	0.069	0.244	0.247	0.068	0.245

5.9. Additional analysis

To attain a further insight on financial-experts' effect on firm payout policy, this section explores the cross-sectional heterogeneity in the relation in question across firms with different governance characteristics and financial constraint. Additionally, the study investigated the effect of financial expert directors on the different types of payout policies (dividend and repurchase).

5.9.1. Cross-section variation in financial-experts' payout

This section investigates whether the relationship between the fraction of financial-experts and dividend payout stand in a different firm setting based on their corporate governance strength (measured by the firm E-Index, CEO duality board size and board independence) and financial constraint (measured by firm size and KZ Index).

5.9.1.1. Corporate governance:

If financial-experts increase dividends by enhancing firm corporate governance and mitigating agency problems, it should be expected that the positive relationship between the fraction of financial-experts on board and payout to be stronger among firms with low corporate governance strength, in support of the outcome hypothesis. This study focuses on four main corporate governance measures that have been widely searched in the literature. These are; firm E-Index, CEO duality, board size and board independence.

Table 5.8 shows the firm main regression after separating the sample based on the firm E-Index. E-Index is the entrenchment index constructed by Bebchuk et al. (2009) related to the firm economic fundamentals and decision making. Bebchuk et al. (2009) design the E-Index based on the six out of 24 provisions in the IRRC database that, according to them, are the most important ones leading to managerial entrenchment. E-Index can be any number between 1 and 6, counting the number of provisions these firms has. The sample is split based on firms with E-Index equal or less than 3 (high shareholders right, thus strong corporate governance) and firms with

E-Index equal or more than 4 (low shareholders right, thus weak corporate governance)[25].

The first three regressions in Table 5.8 show the main study regression on the sample size for firm with high E-Index. For the three main variables; *RDA*, *RDNI* and *RDPS,* the accounting financial-experts appear to be significant at 5% level for the first two and 1% level for the third measure. Where the non-accounting financial-experts appear to be insignificant at all levels for all payout measures, this shows that the study main finding, non-accounting financial-experts positive effect on firm payout policy, appear in weak governed firms. However, Table 5.8 under low E-Index sample regression, results show no significance level of the two financial-experts' variables (accounting and non-accounting) to all firm payout measures; this shows that financial-experts use increased firm dividend payments on weakly governed firms with weak shareholders' rights and not in strongly governed firms with strong shareholders' rights; this indicates that accounting financial-experts use payout as a monitoring instrument to control top management.

The second corporate measure used in this study is the CEO duality. CEO duality is when the same person holds the CEO and chairman position, which gives extreme power to one person only, which has been considered in the literature to weaken firm corporate governance. According to Brickley et al. (1997), the attribute of board monitoring can be measured through the board of directors' leadership structure. In favour of agency theory, researchers argue that combining the CEO and chairman roles negatively affects the scope to which board members can execute their monitoring responsibility (Fama and Jensen 1983; Jensen 1993). Previous studies related to CEO duality report substantial evidence that combining the roles of CEO and chairman weakens the board's monitoring role, hindering their firm value (Kim et al. 2009) and information disclosure policy (Gul and Leung 2004).

[25] E-index is an integer number.

Table 5. 9 Sub-sample based on firm corporate governance – E-Index

This table reports the results of OLS regressions of the relation between financial-experts and firm cash holding after splitting the sample based on the firm corporate governance level. The dependent variables are the firm payout variables; repurchase and dividend to total assets (*RDA*), repurchase and dividend to net income (*RDNI*) and repurchase and dividend per share (*RDPS*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir*.) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). *SIZE*: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. *PPE*: is the net property, plant and equipment divided by total assets. *E-Index*: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. *ROE*: return on equity measured as firm net income divided by market value of equity. *CH* is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	High E-Index			Low E-Index		
	RDA	*RDNI*	*RDPS*	*RDA*	*RDNI*	*RDPS*
	(1)	(2)	(3)	(4)	(5)	(6)
Frac. of Acc. Fin. Exp. Dir. (t-1)	0.0147**	0.295**	0.757***	0.0167	0.197	0.925**
	(0.00743)	(0.124)	(0.277)	(0.0109)	(0.149)	(0.392)
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)	0.00155	-0.0922	0.0464	0.0124	0.166	0.394
	(0.0105)	(0.160)	(0.362)	(0.0156)	(0.195)	(0.514)
SIZE (t-1)	0.00504***	0.0575***	0.582***	0.00603***	0.0798***	0.401***
	(0.00109)	(0.0155)	(0.0390)	(0.00110)	(0.0138)	(0.0415)
CFVOL (t-1)	-0.0576*	-1.924***	-1.767**	-0.0545*	-0.439	-1.670*
	(0.0308)	(0.454)	(0.863)	(0.0303)	(0.516)	(0.975)
R&D (t-1)	-0.0258	-0.123	-2.211**	-0.0375	-0.415	-1.346*

	(0.0487)	(0.518)	(1.042)	(0.0370)	(0.586)	(0.785)
LEV (t-1)	-0.0555***	-0.460***	-1.312***	-0.0674***	-0.515***	-0.321
	(0.0118)	(0.134)	(0.329)	(0.0108)	(0.137)	(0.473)
CH (t-1)	0.0232**	0.286**	0.536**	0.0129*	0.0554	0.0138
	(0.0111)	(0.131)	(0.239)	(0.00687)	(0.0935)	(0.130)
ROE (t-1)	0.0414***	1.013***	2.222***	0.0411***	0.645***	2.427***
	(0.00656)	(0.140)	(0.268)	(0.00986)	(0.134)	(0.369)
KZ (t-1)	-0.000746***	-0.00279	-0.00868**	-0.000591***	-0.00411***	-0.00385
	(0.000165)	(0.00185)	(0.00400)	(0.000156)	(0.00131)	(0.00331)
E-Index (t-1)	-0.000768	0.00957	0.0945	9.16e-05	0.0251	0.143***
	(0.00186)	(0.0361)	(0.0680)	(0.00179)	(0.0246)	(0.0494)
M/B	0.00341***	0.0205***	0.0658***	0.00450***	0.0173***	0.0778***
	(0.000581)	(0.00463)	(0.0137)	(0.000633)	(0.00514)	(0.0178)
PPE	0.000607	0.0688	-0.594*	0.00157	-0.0694	-0.0945
	(0.00921)	(0.144)	(0.322)	(0.0106)	(0.154)	(0.346)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,667	5,667	5,667	4,393	4,393	4,393
R-squared	0.267	0.066	0.252	0.268	0.083	0.268

Table 5.9 shows the study main regression results after splitting the sample based on CEO duality. The three regressions of firms with CEO and chairman role held by the same person shows that the fraction accounting financial-experts on board has a positive effect on all firm payout variables. However, fraction accounting financial-experts were only significant at 10% level for *RDA* and *RDNI* where they were significant at 5% level with *RDPS*.

Moving to the same regressions on the firm sample with CEO and chairman position held by different people, results found that for *RDA* and *RDNI*, accounting and non-accounting financial-experts have no significant relationship with payout. However, for the *RDPS*, it appears to have a significant relationship at 5% level with accounting financial-experts. When comparing the two samples *RDPS* relationship to accounting financial-experts, there is a higher coefficient for the sample of firms with non-CEO duality than firms with CEO duality (0.840 and 0.674 correspondingly) indicating a higher relationship; this shows that even though accounting financial-experts increase payout per share in firms with non-CEO duality, this effect is not found when payouts scaled by firm assets or net income.

The second corporate governance measure used in this cross-section analysis is board size. Firms' effectiveness of monitoring is determined by the ease of communication and coordination between directors on board (Boubaker et al. 2015). According to Lipton and Lorsch (1992), small boards are more beneficial to monitoring responsibilities' excellence due to results of better and more efficient coordination between fewer directors. In view of this argument, studies found an inverse relationship between board size and firm market valuation (Yermack 1996; Eisenberg et al. 1998; Mak and Kusnadi 2005). To the extent that small boards appear to restrain agency problems, enhanced shareholder control over firm corporate governance should be better in firms with a small board of directors.

Table 5. 10 Sub-sample based on firm corporate governance – CEO Duality

This table reports the results of OLS regressions of the relation between financial-experts and firm cash holding after splitting the sample based on the firm corporate governance level. The dependent variables are the firm payout variables; repurchase and dividend to total assets (*RDA*), repurchase and dividend to net income (*RDNI*) and repurchase and dividend per share (*RDPS*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). *SIZE*: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. *PPE*: is the net property, plant and equipment divided by total assets. *E-Index*: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. *ROE*: return on equity measured as firm net income divided by market value of equity. *CH* is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Duality			Non-Duality		
	RDA	*RDNI*	*RDPS*	*RDA*	*RDNI*	*RDPS*
	(1)	(2)	(3)	(4)	(5)	(6)
Frac. of Acc. Fin. Exp. Dir. (t-1)	0.0134*	0.217*	0.674**	0.0110	0.246	0.840**
	(0.00790)	(0.116)	(0.311)	(0.0112)	(0.176)	(0.365)
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)	0.00355	0.0393	0.194	0.0168	0.0268	0.424
	(0.0127)	(0.161)	(0.401)	(0.0136)	(0.224)	(0.441)
SIZE (t-1)	0.00518***	0.0637***	0.487***	0.00599***	0.0533**	0.429***
	(0.000989)	(0.0127)	(0.0402)	(0.00168)	(0.0220)	(0.0439)
CFVOL (t-1)	-0.0752***	-0.995***	-1.382	-0.0297	-1.536***	-2.220***
	(0.0283)	(0.381)	(0.928)	(0.0306)	(0.504)	(0.639)

R&D (t-1)	-0.0769*	-0.457	-3.276***	0.0368	0.193	0.304
	(0.0456)	(0.561)	(1.018)	(0.0372)	(0.600)	(0.815)
LEV (t-1)	-0.0557***	-0.408***	-0.774*	-0.0647***	-0.605***	-0.804**
	(0.0108)	(0.127)	(0.409)	(0.0128)	(0.152)	(0.401)
CH (t-1)	0.0205**	0.111	0.287	0.0170**	0.276**	0.157
	(0.00919)	(0.103)	(0.179)	(0.00863)	(0.120)	(0.228)
ROE (t-1)	0.0442***	0.771***	2.844***	0.0428***	0.895***	2.033***
	(0.00756)	(0.122)	(0.341)	(0.00909)	(0.176)	(0.286)
KZ (t-1)	-0.000697***	-0.00482***	-0.00529	-0.000668***	-0.00209	-0.00787**
	(0.000169)	(0.00149)	(0.00350)	(0.000171)	(0.00184)	(0.00379)
E-Index (t-1)	-0.00159	-0.00204	0.0416	0.000551	0.0139	0.0138
	(0.00111)	(0.0153)	(0.0377)	(0.00161)	(0.0225)	(0.0523)
M/B	0.00431***	0.0198***	0.0739***	0.00334***	0.0170***	0.0655***
	(0.000597)	(0.00443)	(0.0151)	(0.000646)	(0.00585)	(0.0169)
PPE	-0.000293	0.0279	-0.467	0.00533	0.0586	-0.406
	(0.00821)	(0.122)	(0.300)	(0.0131)	(0.241)	(0.377)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,768	6,768	6,768	3,292	3,292	3,292
R-squared	0.273	0.066	0.255	0.267	0.083	0.226

Table 5.10 shows the study main regression for the split samples based on firm board size. The sample split was based on the yearly board of directors' sample median. The results of firms with a small board of directors (strong corporate governance), the regressions show that there is no relationship between the portion of financial-experts on board variables and firm *RDA* and *RDNI*. However, there is a positive relationship between the fraction of accounting financial-experts and firm *RDPS* at 5% significance level. For the sample with a large board size (weak corporate governance), the table shows that the fraction of accounting experts has a positive and significant relationship with firm payout variables (a significance level of 10% with *RDA* and 5% with *RDNI* and *RDPS*). However, the non-accounting financial-experts appear to be insignificant with all regressions in the two samples. For the sample spilt based on firm board size, even though accounting financial-experts have a significant positive relationship to firm *RDPS* for both samples, accounting financial-experts appear to increase firm *RDPS* higher in firms with large board size with accounting financial-experts' coefficient of 0.919 compared to 0.572.

The last corporate governance measure used in this sub-sample analysis is firm board independence. Independent directors are assumed to have completely independent oversight of top management since these directors, apart from directorship fees, have no financial interests in the firm (Rosenstein and Wyatt 1990; Adams et al. 2010). According to the agency theory, independent directors on board are essential for board effectiveness on monitoring and decision making (Jensen and Meckling 1976; Fama and Jensen 1983). Thus, to reduce agency problem, independent directors act as good monitors pursuing shareholders' interest (Yermack 2004; Sharma 2011; Armstrong et al. 2014).

Table 5.11 shows that, in respect of board independence, the fraction of financial-experts has mixed results for both samples (high and low board independence firm). For *RDA* the fraction of accounting financial-experts for firms with low board independence has a positive effect on firms' payout in relation to firm assets. However, it has no effect on firms with high board independence. For the other firm payout measure, *RDNI*, the fraction of accounting financial-experts appear to have a relationship with payout in firms with high board independence but not in firms with low board independence. For *RDPS*, firms with high board independence pay

Table 5. 11 Sub-sample based on firm corporate governance – Board Size

This table reports the results of OLS regressions of the relation between financial-experts and firm cash holding after splitting the sample based on the firm corporate governance level. The dependent variables are the firm payout variables; repurchase and dividend to total assets (*RDA*), repurchase and dividend to net income (*RDNI*) and repurchase and dividend per share (*RDPS*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir*.) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir*.). *SIZE*: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. *PPE*: is the net property, plant and equipment divided by total assets. *E-Index*: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. *ROE*: return on equity measured as firm net income divided by market value of equity. *CH* is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Small Board Size			Large Board Size		
	RDA	*RDNI*	*RDPS*	*RDA*	*RDNI*	*RDPS*
	(1)	(2)	(3)	(4)	(5)	(6)
Frac. of Acc. Fin. Exp. Dir. (t-1)	0.0113	0.159	0.572**	0.0166*	0.331**	0.919**
	(0.00840)	(0.131)	(0.262)	(0.00924)	(0.149)	(0.432)
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)	0.0111	0.0621	0.158	0.00742	0.0477	0.872
	(0.0124)	(0.168)	(0.332)	(0.0133)	(0.185)	(0.552)
SIZE (t-1)	0.00561***	0.0469***	0.425***	0.00323***	0.0422**	0.442***
	(0.00138)	(0.0182)	(0.0396)	(0.00109)	(0.0166)	(0.0477)
CFVOL (t-1)	-0.0452	-1.266***	-1.510**	-0.0548**	-1.324***	-2.714*
	(0.0301)	(0.415)	(0.637)	(0.0272)	(0.462)	(1.389)

R&D (t-1)	-0.0398	-0.432	-1.184	-0.0291	0.428	-4.551***
	(0.0397)	(0.426)	(0.771)	(0.0540)	(0.976)	(1.744)
LEV (t-1)	-0.0554***	-0.548***	-0.479	-0.0668***	-0.352**	-1.212**
	(0.0112)	(0.128)	(0.320)	(0.0111)	(0.143)	(0.477)
CH (t-1)	0.0183**	0.204**	0.296*	0.0284***	0.127	-0.0224
	(0.00771)	(0.0883)	(0.157)	(0.00953)	(0.171)	(0.346)
ROE (t-1)	0.0465***	0.810***	2.149***	0.0330***	0.857***	2.791***
	(0.00788)	(0.124)	(0.303)	(0.00769)	(0.157)	(0.316)
KZ (t-1)	-0.000609***	-0.00366***	-0.00463*	-0.000884***	-0.00239	-0.0179**
	(0.000142)	(0.00134)	(0.00273)	(0.000225)	(0.00306)	(0.00839)
E-Index (t-1)	-0.000144	0.0142	0.0461	-0.00356***	-0.0253	-0.0165
	(0.00130)	(0.0168)	(0.0386)	(0.00121)	(0.0177)	(0.0518)
M/B	0.00460***	0.0215***	0.0872***	0.00332***	0.0152***	0.0504***
	(0.000689)	(0.00515)	(0.0185)	(0.000510)	(0.00389)	(0.0166)
PPE	-0.00151	0.0282	-0.377	0.0111	-0.00455	-0.373
	(0.0102)	(0.134)	(0.268)	(0.00890)	(0.174)	(0.398)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,577	5,577	5,577	4,480	4,480	4,480
R-squared	0.241	0.073	0.198	0.321	0.062	0.246

Table 5. 12 Sub-sample based on firm corporate governance – Board independence

This table reports the results of OLS regressions of the relation between financial-experts and firm cash holding after splitting the sample based on the firm corporate governance level. The dependent variables are the firm payout variables; repurchase and dividend to total assets (*RDA*), repurchase and dividend to net income (*RDNI*) and repurchase and dividend per share (*RDPS*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). *SIZE*: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. *PPE*: is the net property, plant and equipment divided by total assets. *E-Index*: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. *ROE*: return on equity measured as firm net income divided by market value of equity. *CH* is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Low Board Independence			High Board Independence		
	RDA	*RDNI*	*RDPS*	*RDA*	*RDNI*	*RDPS*
	(1)	(2)	(3)	(4)	(5)	(6)
Frac. of Acc. Fin. Exp. Dir. (t-1)	0.0179**	0.185	0.580**	0.0110	0.329**	0.906***
	(0.00841)	(0.116)	(0.288)	(0.00787)	(0.143)	(0.303)
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)	0.0165	0.132	0.449	-0.00222	-0.0446	0.105
	(0.0126)	(0.173)	(0.378)	(0.0114)	(0.162)	(0.377)
SIZE (t-1)	0.00552***	0.0764***	0.405***	0.00519***	0.0537***	0.530***
	(0.00102)	(0.0141)	(0.0330)	(0.00108)	(0.0145)	(0.0393)
CFVOL (t-1)	-0.0699***	-1.292***	-1.980***	-0.0393	-1.378***	-1.587*
	(0.0235)	(0.313)	(0.736)	(0.0313)	(0.492)	(0.852)

R&D (t-1)	-0.0527	-0.615	-1.197	-0.0127	0.154	-2.058**
	(0.0351)	(0.409)	(0.730)	(0.0441)	(0.627)	(1.022)
LEV (t-1)	-0.0701***	-0.570***	-0.948***	-0.0496***	-0.451***	-0.602
	(0.00890)	(0.123)	(0.328)	(0.0112)	(0.144)	(0.366)
CH (t-1)	0.0207***	0.277***	0.262*	0.0151	0.0388	0.240
	(0.00634)	(0.0790)	(0.135)	(0.00951)	(0.131)	(0.198)
ROE (t-1)	0.0357***	0.748***	2.339***	0.0484***	0.992***	2.576***
	(0.00813)	(0.128)	(0.325)	(0.00686)	(0.146)	(0.266)
KZ (t-1)	-0.000671***	-0.00318***	-0.00458	-0.000679***	-0.00400	-0.0100**
	(0.000134)	(0.00118)	(0.00304)	(0.000180)	(0.00245)	(0.00440)
E-Index (t-1)	-0.00209	-0.00232	0.0235	-1.93e-05	0.00366	0.00513
	(0.00131)	(0.0172)	(0.0423)	(0.00112)	(0.0165)	(0.0368)
M/B	0.00410***	0.0187***	0.0669***	0.00378***	0.0193***	0.0722***
	(0.000618)	(0.00474)	(0.0166)	(0.000506)	(0.00419)	(0.0137)
PPE	-0.00217	-0.0903	-0.439	0.00381	0.172	-0.459
	(0.00951)	(0.126)	(0.289)	(0.00845)	(0.142)	(0.308)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,962	4,962	4,962	5,095	5,095	5,095
R-squared	0.260	0.077	0.218	0.271	0.069	0.271

more per share than firms with low board independence (0.906 compared to 0.580, respectively). The significance level of the relationship between the fraction of accounting financial-experts and payout per share is 5% for firm with low board independence and 1% for firms with high board independence, indicating a stronger relationship in firms with high board independence.

All in all, measured by E-Index, CEO Duality and board size, the results show that the fraction of accounting financial experts appears mainly in firms with weak corporate governance; this is in line with the outcome theory, financial-experts play a significant role in enhancing board monitoring in firms with enchanted managers. This appears in the significant increase in payout for firms with high E-Index, CEO duality role and large board size. However, for board independence, the results are inconclusive. The results vary based on board independence and payout measure.

5.9.1.2. Financial constraints:

If financial-experts increase dividends to mitigate agency problem, then the relationship between the fraction of financial-experts on board effect on dividend policy should be more pronounced in financially constrained firms. According to Chae et al. (2009), the relationship between corporate governance and firm payout depends on the firm size of agency conflict and the level of financial constraints. According to the agency theory, in the presence of agency conflict of interest, stronger corporate governance increases firm dividend payment to minimise top management misconduct of free cash flow (Easterbrook 1984; Jensen 1986; Zwiebel 1996). Managers in financially constrained firms tend to increase their cash holding due to the higher cost of raising external finances (Myers and Majluf 1984). If the agency theory holds, the study expects that the fraction of financial-expert directors' influence on firm payout to be shown more in financial constraint firms.

There are a variety of ways to measure financial constraints in the literature. This study employs two different proxies, suggested in previous studies. First, following previous studies (Faulkender and Wang 2006; Nguyen et al. 2018), the study uses firm size (measured by firm total assets). Large firms are assumed to be well-known in the market and therefore face fewer financial constraints when raising money externally to fund their investments. Second, following previous studies

(Lamont et al. 2001; Baker et al. 2003; Malmendier and Tate 2005; Güner et al. 2008; Li 2011; Florackis and Sainani 2018) the study constructs the KZ Index as explained in the previous section. According to the Kaplan and Zingales (1997) argument, single variable proxies (e.g. firm size) does not capture the real status of firm financial constraint. The higher KZ Index indicates more constrained firms. The study split the sample based on the sample constraint variable yearly median into constrained firms (small size firms or firms with high KZ Index) and unconstrained firms (large size firms or firms with low KZ Index).

Table 5.12 shows the main regressions based on the sample split of firm size. The first three columns show the fraction of financial-experts on board relation to firm payout variables for the small firms' sample. Results show a positive and significant relationship between the fraction of accounting financial-expert directors and firm payout (significant at 5%, 10% and 1% for *RDA*, *RDNI* and *RDPS* correspondingly). However, columns 4, 5 and 6 show different results for the firms with large firm size. It appears that for large firms, only *RDPS* have a positive and significant relationship to the fraction of accounting financial-experts, These results suggest that even though accounting financial-experts on board increases the firm payout per share for large firms, they do not affect payouts in relation to form assets or net income. For non-accounting financial-expert directors, the results show no significant relationship to firm payout variables in both samples.

Measuring firm financial constraint level based on firm *KZ* Index, Table 5.13 shows results on sample split based on firm *KZ* Index level. Columns 1, 2 and 3 show the study's main regression results for high *KZ* Index firms (constraint firms). It appears that other than *RDA*, accounting financial-experts have a positive and significant relationship to firm payout at 1% for *RDNI* and 10% for *RDPS*. For unconstrained firms based on low *KZ* Index measure, results show that other than *RDPS*, there is no relationship between the fraction of accounting financial-experts and firm payout. Moreover, for non-accounting financial-experts on board, the results for high and low *KZ* Index firms show no significant relationship to firm payout variables.

Table 5. 13 Sub-sample based on firm financial constrain – Firm size

This table reports the results of OLS regressions of the relation between financial-experts and firm cash holding after splitting the sample based on firm size. The dependent variables are the firm payout variables; repurchase and dividend to total assets (*RDA*), repurchase and dividend to net income (*RDNI*) and repurchase and dividend per share (*RDPS*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir*.) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir*.). *SIZE*: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. *PPE*: is the net property, plant and equipment divided by total assets. *E-Index*: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. *ROE*: return on equity measured as firm net income divided by market value of equity. *CH* is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. Robust standard errors in parentheses *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively

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	Small Firms			Large Firms		
	RDA	*RDNI*	*RDPS*	*RDA*	*RDNI*	*RDPS*
	(1)	(2)	(3)	(4)	(5)	(6)
Frac. of Acc. Fin. Exp. Dir. (t-1)	0.0185**	0.253*	0.720***	0.0119	0.194	1.019**
	(0.00904)	(0.150)	(0.239)	(0.00865)	(0.134)	(0.418)
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)	0.00742	-0.00584	-0.0379	0.00908	0.0531	0.712
	(0.0131)	(0.176)	(0.312)	(0.0135)	(0.165)	(0.664)
SIZE (t-1)	0.00911***	0.0739**	0.561***	0.00186	0.0488**	0.449***
	(0.00259)	(0.0325)	(0.0657)	(0.00132)	(0.0206)	(0.0756)
CFVOL (t-1)	-0.0344	-0.942**	-0.841	-0.0617*	-2.011***	-4.045***
	(0.0250)	(0.413)	(0.666)	(0.0338)	(0.688)	(1.238)

R&D (t-1)	-0.0825**	-0.857*	-2.005***	0.112**	1.672*	-3.053
	(0.0395)	(0.452)	(0.750)	(0.0523)	(0.882)	(2.095)
LEV (t-1)	-0.0615***	-0.586***	-0.880***	-0.0553***	-0.192	-0.784
	(0.0112)	(0.123)	(0.274)	(0.0110)	(0.150)	(0.598)
CH (t-1)	0.0219***	0.255***	0.453***	0.0137	-0.0579	-0.471
	(0.00797)	(0.0908)	(0.147)	(0.0117)	(0.131)	(0.333)
ROE (t-1)	0.0353***	0.743***	1.614***	0.0415***	0.869***	3.152***
	(0.00886)	(0.146)	(0.278)	(0.00654)	(0.137)	(0.357)
KZ (t-1)	-0.000684***	-0.00330**	-0.00796**	-0.000646***	-0.00421	-0.00777
	(0.000151)	(0.00141)	(0.00349)	(0.000154)	(0.00256)	(0.00618)
E-Index (t-1)	-0.00138	0.000234	-0.0141	-0.00253**	-0.00106	0.0389
	(0.00143)	(0.0183)	(0.0362)	(0.00117)	(0.0178)	(0.0587)
M/B	0.00475***	0.0213***	0.0807***	0.00282***	0.0158***	0.0558***
	(0.000684)	(0.00478)	(0.0170)	(0.000505)	(0.00439)	(0.0150)
PPE	-0.00572	0.0844	-0.268	0.0121	-0.0960	-0.827**
	(0.0113)	(0.156)	(0.284)	(0.00874)	(0.155)	(0.417)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,409	5,409	5,409	4,649	4,649	4,649
R-squared	0.228	0.065	0.186	0.381	0.094	0.253

Table 5. 14 Sub-sample based on firm financial constrain – KZ index

This table reports the results of OLS regressions of the relation between financial-experts and firm cash holding after splitting the sample based on the firm KZ index. The dependent variables are the firm payout variables; repurchase and dividend to total assets (*RDA*) , repurchase and dividend to net income (*RDNI*) and repurchase and dividend per share (*RDPS*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir.*) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir.*). *SIZE*: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. PPE: is the net property, plant and equipment divided by total assets. *E-Index*: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. *ROE*: return on equity measured as firm net income divided by market value of equity. *CH* is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	high KZ			low KZ		
	RDA	*RDNI*	*RDPS*	*RDA*	*RDNI*	*RDPS*
	(1)	(2)	(3)	(4)	(5)	(6)
Frac. of Acc. Fin. Exp. Dir. (t-1)	0.00775	0.343***	0.515*	0.0160	0.0711	1.004***
	(0.00695)	(0.118)	(0.287)	(0.0100)	(0.155)	(0.363)
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)	0.0124	0.103	0.618	-0.00518	-0.117	-0.261
	(0.00970)	(0.150)	(0.442)	(0.0160)	(0.197)	(0.435)
SIZE (t-1)	0.00354***	0.0558***	0.402***	0.00536***	0.0714***	0.517***
	(0.000862)	(0.0140)	(0.0359)	(0.00132)	(0.0151)	(0.0449)
CFVOL (t-1)	-0.0424**	-1.277***	-2.023**	-0.0367	-1.028**	-0.855
	(0.0202)	(0.390)	(0.874)	(0.0312)	(0.456)	(0.725)

R&D (t-1)	-0.0587	0.466	-1.142	-0.0157	-0.522	-2.028**
	(0.0515)	(0.807)	(1.204)	(0.0368)	(0.457)	(0.834)
LEV (t-1)	-0.0296***	-0.176	-0.611	-0.0588***	-0.473***	-0.366
	(0.00982)	(0.127)	(0.415)	(0.0122)	(0.146)	(0.371)
CH (t-1)	0.0325*	-0.0210	0.213	0.0163**	0.171**	0.289**
	(0.0184)	(0.205)	(0.455)	(0.00642)	(0.0870)	(0.140)
ROE (t-1)	0.0304***	0.721***	1.987***	0.0866***	1.030***	3.204***
	(0.00528)	(0.106)	(0.218)	(0.0196)	(0.280)	(0.773)
E-Index (t-1)	-0.000829	-0.00952	-0.00718	-0.00204	0.0181	0.0677
	(0.000920)	(0.0150)	(0.0423)	(0.00159)	(0.0199)	(0.0417)
M/B	0.00207***	0.0112**	0.0395**	0.00450***	0.0163***	0.0682***
	(0.000523)	(0.00475)	(0.0155)	(0.000558)	(0.00435)	(0.0140)
PPE	0.00390	0.170	0.102	0.0741***	0.661***	0.747
	(0.00819)	(0.135)	(0.300)	(0.0173)	(0.220)	(0.575)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,025	5,025	5,025	5,024	5,024	5,024
R-squared	0.230	0.077	0.220	0.227	0.062	0.294

All in all, results on the effect of firm financial constraint on the relationship between financial-experts on board and firm payout indicate that the relationship is driven by firm financial constraint level. In highly constrained firms, where top management tends to hold more cash, accounting financial-experts on board play a major role in increasing the firm payout level. This proposition is in line with the study main argument that directors' financial-experience enhances board monitoring in reducing agency conflict of interest.

5.9.2. Different payout policies

To further understand the dimension of financial-experts' effect on firm payouts, this section provides an additional analysis of the effect of financial-expert directors on different types of firm payout policies. Firms make the decisions on either pay investors dividend, repurchase stocks or do both. The reasoning behind why firms pay dividend has been a under a heated debate for more than five decades, since Lintner (1956) influential paper. According to Miller and Modigliani (1961), in a perfect capital market, assuming no tax, the dividend should have no effect on investors and firms. However, in the presence of firm tax, Black (1976) found it difficult to justify why firms pay dividends. Unlike dividend payment, stock repurchase offers firms and investors significant flexibility and tax advantages (Guay and Harford 2000; Skinner 2008). Unlike dividend, payments in the form of repurchase is not related to investors' future payout expectation, constructing it to be less costly than dividend (Grullon and Michaely 2002). According to Fama and French (2001), the tendency of US industrials to pay dividends occurred from the 1970s through the late 1990s. Hsieh and Wang (2009) show that, since 1996, corporate payout using repurchase exceeded dividend payments.

Previous study findings show that, aside from firms' payout level, firms' choice of payout structure is also affected by their corporate governance strength. Bhabra and Luu (2015) argue that, as repurchases are not mandatory in nature when compared to dividends, enchanted managers will pass on repurchasing stocks and adopt a pre-commit payout policy. When comparing payout policies, John and Knyazeva (2006) found that, when corporate governance is weak, firms are less likely

to adopt a repurchase policy. Instead, firms are more likely to adopt dividend policy or mixture of dividend-repurchase policy.

Table 5.14 uses six payout measures, in which three measures the level of firm payout through repurchase (repurchase asset ratio (*RAR*), repurchase to net income (*RNI*) and repurchase per share (*RPS*)) and three measures the firm payout through dividend (dividend assets ratio (*DAR*), dividend to net income (*DNI*) and dividend per share (*DPS*)). Columns 1 and 2 show the study main regression using *RAR* and *DAR* as the main variables, respectively. Results indicate that scaled by firm total assets, the fraction of accounting financial-experts on board have a positive and significant relationship at 10% level to the firm repurchase and not dividend. Moreover, columns 3 and 4 show the study main regression using the *RNI* and *DNI* as dependent variables. Consistent with the first two columns, accounting financial-experts have a positive and significant relationship to firm repurchase and not dividend (scaled by firm net income). When calculating payout per shares, column 5 and 6 shows that the fraction of financial-experts enhances the firm repurchase and dividend level. However, when comparing the two regressions, *RPS* has a higher coefficient (0.426) when compared to *DPS* (0.315), indicating that the fraction of accounting financial-experts on board has a stronger effect to firm repurchase.

In summary, giving the flexibility of firm repurchase option, enchanted managers would be driven to drift from repurchasing stocks as a form of payout and adhere with pre-committed dividend payments only. This study shows that the fraction of accounting financial-experts on board would not only increase firm payout level, but would be more likely to pay shareholders in the form of repurchase than dividends. The results emphasise financial-experts' role in enhancing board monitoring through the influence of distributing free cash flow in the form of non-pre-committed shareholders' payments.

Table 5. 15 Financial Experience and firm payout policies

This table reports the results of OLS regressions of the relation between financial-experts and firm different payout policies. The dependent variables are the firm payout variables; repurchase to assets ratio (*RAR*), dividend assets ratio (*DAR*), repurchase to net income (*RNI*), dividend to net income (*DNI*), repurchase per share (*RPS*) and dividend per share (*DPS*). The main independent variables are the percentage of accounting financial-experts on board (*Frac. of Acc. Fin. Exp. Dir*.) and the percentage of non-accounting financial-experts on board (*Frac. of Non-Acc. Fin. Exp. Dir*.). *SIZE*: firm size measured as the log of the firm total assets. *LEV*: is the firm leverage: measured as firm long term debt divided by assets net of cash. *R&D*: is the firm research and development expenses divided by sale. *M/B*: is the firm market-to-book ratio, measured as the firm market value divided by firm assets net of cash. *CFVOL*: is the firm cash flow volatility measured as is measured as the standard deviation of cash flow-to-assets net of cash for the past 10 years. *PPE*: is the net property, plant and equipment divided by total assets. E-Index: is the entrenchment index. *KZ*: is the Kaplan-Zingales Index. ROE: return on equity measured as firm net income divided by market value of equity. *CH* is the firm cash holding measured as cash and short term investment divided by assets net of cash and short term investments. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	RAR	*DAR*	*RNI*	*DNI*	*RPS*	*DPS*
	(1)	(2)	(3)	(4)	(5)	(6)
Frac. of Acc. Fin. Exp. Dir. (t-1)	0.0102*	0.00364	0.170**	0.0512	0.426**	0.315***
	(0.00583)	(0.00288)	(0.0679)	(0.0457)	(0.208)	(0.0858)
Frac. of Non-Acc. Fin. Exp. Dir. (t-1)	0.00475	0.00321	0.0443	0.0281	0.170	0.0962
	(0.00864)	(0.00383)	(0.0953)	(0.0567)	(0.279)	(0.0994)
SIZE (t-1)	0.00439***	0.00138***	0.0546***	0.0193***	0.305***	0.174***
	(0.000730)	(0.000417)	(0.00751)	(0.00605)	(0.0264)	(0.0132)
CFVOL (t-1)	-0.00810	-0.0430***	-0.385	-0.750***	-0.657	-1.142***
	(0.0189)	(0.00814)	(0.236)	(0.129)	(0.493)	(0.239)
R&D (t-1)	0.00323	-0.0341***	0.180	-0.372***	-0.961	-0.659***
	(0.0319)	(0.0115)	(0.321)	(0.127)	(0.661)	(0.242)
LEV (t-1)	-0.0452***	-0.0143***	-0.379***	-0.0897*	-0.531**	-0.309***

	(0.00723)	(0.00323)	(0.0699)	(0.0502)	(0.264)	(0.0973)
CH (t-1)	0.0161***	9.50e-05	0.136**	-0.000972	0.219*	0.0114
	(0.00599)	(0.00224)	(0.0601)	(0.0278)	(0.128)	(0.0485)
ROE (t-1)	0.0335***	0.00857***	0.556***	0.242***	1.746***	0.659***
	(0.00502)	(0.00224)	(0.0653)	(0.0501)	(0.198)	(0.0734)
KZ (t-1)	0.000110	-0.000748***	0.00264***	-0.00665***	0.00527**	-0.0117***
	(0.000101)	(7.64e-05)	(0.000951)	(0.000736)	(0.00232)	(0.00130)
E-Index (t-1)	0.000363	-0.00101**	0.00898	-0.00352	0.0363	-0.0109
	(0.000833)	(0.000440)	(0.00886)	(0.00593)	(0.0273)	(0.0126)
M/B	0.00275***	0.00121***	0.0138***	0.00397**	0.0552***	0.0154***
	(0.000367)	(0.000171)	(0.00261)	(0.00165)	(0.00972)	(0.00405)
PPE	-0.0143**	0.0153***	-0.152**	0.163***	-0.680***	0.248**
	(0.00647)	(0.00331)	(0.0736)	(0.0626)	(0.214)	(0.104)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,070	10,060	10,070	10,060	10,070	10,060
R-squared	0.216	0.325	0.115	0.116	0.186	0.410

5.10. Conclusion

Payout policy is a strategic plan used by directors when they decide on whether to distribute cash to shareholders or accumulate it for future investment. According to the agency theory, top management prefer retaining more cash for financial flexibility and to escape the external financing additional monitoring. Findings of prior studies on the influence of effective corporate governance mechanism on firm payout policy is mixed. Motivated by the high increase on financial-experts on board and based on the argument that financial-expert directors enhance board monitoring and advisory role, this study investigates, for the first time, the dynamic of the relationship between the fraction of financial-experts on board to one of the firms' main financial decisions, payout policy.

Using a sample of 952 firms and 10060 firm-year observations for the period between 1999 and 2017, this study found that, in the case of enhanced corporate governance, through the appointment of accounting financial-experts on board, accounting financial-experts force managers to payout more to shareholders. This result is in line with the complement hypothesis. Stronger corporate governance allows shareholders to minimise the amount of cash available to managers to minimise the misuse of free cash flow. These findings are in line with the argument that better firm corporate governance enhances shareholder protection. However, when measuring financial-experts by directors' non-accounting financial experience, the results show no indication of any influence on firm payout policy. This suggests that enhancing board of directors' composition via the appointment of non-accounting financial-experts does not have the same efficiency as the appointment of accounting financial-experts. The study's main findings are robust to controlling for board composition and exclusion of utility firms.

The additional undertaken in this study analysis investigates whether the relationship between the fraction of financial-experts and dividend payout stands in different firm settings based on their corporate governance strength and financial constraints position. Measured by firm E-Index, CEO duality, board size and board independence, the results show that the effect of accounting financial-experts on increasing firm payout is more prominent in firms with weak corporate governance

mechanism (firm with high E-Index, CEO duality and large board size). However, the results are mixed based on firm board independence and differ based on payout measure. Results on the effect of firm financial constraint on the relationship between financial-experts on board and firm payout show that the relationship is driven by firm financial constraint level. In highly financially constrained firms, where top management tend to retain more cash, accounting financial-experts on board play a significant role in increasing the firm payout level. These results are in line with the study's main argument that directors' financial experience enhances board monitoring, reducing agency conflict of interest.

In addition to the payout level, directors also decide on different payout policies (dividend or repurchase). Following the fall in dividend payment and the rise in firm repurchase activities, this study investigates the effect of financial-experts on the firm payout policy chosen. Given the investors' expectation of cumulative dividend payments, stock repurchase offers firms and investors considerable flexibility and tax advantages. However, considering the flexibility of firm repurchase option, arguably, enchanted managers would be driven to drift from repurchasing stocks as a form of payouts. This study shows that the fraction of accounting financial-experts on board would not only increase firm payout level, but might be more likely to pay shareholders in the form of repurchase. This result emphasises the role of financial-experts on board in enhancing board monitoring through their influence on distributing free cash flow in the form of non-pre-committed shareholders' payments. Nevertheless, the following chapter provides the thesis conclusion with an overview of the thesis main findings and contributions and the thesis implications, limitations and future research suggestions.

Chapter 6: Conclusion

6.1. Introduction

This thesis tests the possible link between directors on board financial experience and firm stock price synchronicity, cash holding and payout policy. Specifically, three empirical themes, tested empirically in individual empirical chapters of the thesis, follow. First, Chapter 3 tests the effect of the fraction of financial-experts on board on firm stock price synchronicity. Second, Chapter 4 tests the effect of the fraction of financial-experts on board on firm cash holding. Third, Chapter 5 tests the effect of the fraction of financial-experts on board on firm payout policy.

The remainder of this chapter is organised as follows: Section 5.2 summarises the first empirical chapter (Chapter 2), comprising main findings and contribution to literature of the relationship between directors' financial experience and firm stock price synchronicity; Section 5.3 summarises the second empirical chapter (Chapter 3), comprising main findings and contribution to literature which investigate the relationship between directors' financial experience and firm cash holding; Section 5.4 summarises the second empirical chapter (Chapter 4), consisting of main findings and contribution to literature which examine the relationship between directors' financial experience and firm payout policy; Section 5.5 outlines the research implications, limitations and future research.

6.2. Financial experience on board and stock price synchronicity

Chapter 3 empirically investigates the impact directors with financial experience have on firm information environment, measured by the firm stock price synchronicity. Further analysis tests the relationship between directors' financial experience and firm cash risk, the effect of financial-experts' demography on stock price synchronicity, a cross-section variation on the relationship between financial-experts and stock price synchronicity and finally tests the endogeneity of the relationship between directors' financial experience and stock price synchronicity by difference-in-difference analysis.

The main findings of this chapter can be summarised as follows. First, the study found that more financial experience on board results in reducing firm stock

price synchronicity. However, this relationship is only shown when financial experience measured by directors' previous experience related to accounting; directors with non-accounting financial experience (as defined by the SOX, all directors with previous experience supervising financial-experts) have no effect on firms' stock price synchronicity. This finding is consistent with the conjecture that directors with non-accounting financial experience fail to obtain financial experience through only supervising financial-experts. The study than conducted different robustness tests on the study's main results and found that the study's main findings are robust to other board attributes, stringent sample (minimum of 50 weeks of observations per year instead of 30), the presence of top firms in the sample and the presence of unusual stock price behaviour due to the financial crisis.

Second, to obtain valuable insight into the influence of financial experts on firm stock price synchronicity, the study investigated the effect of directors' characteristics and found that for different directors' characteristics, the fraction of accounting financial-experts' effect on stock price synchronicity differs. Results show that only increasing the fraction of accounting financial-experts with busy, independent directors and male directors can improve the amount of information embedded in the share price. Third, the study tested the heterogeneity of the results and reported that the relationship between accounting financial-experts and stock price synchronicity is non-heterogeneous across different types of firms. The relationship is mainly found in firms with CEO duality, low institutional ownership and high E-Index. Fourth, the study accounted for endogeneity concern of the result and found no concern arises from the endogeneity of the study's main regression. This suggests that the relationship between directors' financial experience was not driven by unobserved variables or reverse causality effect. Fifth, the study found no relationship between directors' financial experience and firm crash risk. According to Kothari et al. (2009), managers tend to delay the disclosure of bad news to investors in the presence of a conflict of interest, which results in stock crash risk when all bad news is suddenly released (Jin and Myers 2006). They argue that better transparent environment reduces firm crash risk. However, the study failed to obtain any financial-experts' effect on reducing the managers' incentive on withholding bad news.

This study contributes to the financial literature on the effectiveness of financial-expert directors in several ways. First, the study's main results indicate that financial directors play a significant role in improving the firm's information environment. In particular, not all financial-expert directors are effective in this regard — only those with prior accounting experience matter. Second, results challenge the SOX Act definition of financial experience, which includes "supervising" employees with financial reporting responsibilities. Directors with CEO- and Chairman-experiences failed to have the same positive influence. Third, as most recent studies considered the financial expertise of corporate audit committee (McDaniel et al. 2002; Davidson et al. 2004; Mangena and Pike 2005; Carcello et al. 2006b) or on banks' boards (Fernandes and Fich 2009; Minton et al. 2014), the new trend for increasing financial expertise on the board of directors provides an opportunity to embed the financial expertise perspective into the corporate board of directors. Board of directors has the primary responsibility of supervising the firm's financial reporting process. The board regularly meets the firm external auditors and accounting executive to assess firm financial statement, audit process and internal control mechanism (Klein 2002). Given these responsibilities, this study's evidence supports claims that when it comes to firms' information environment, corporate board of directors' accounting financial experience matters. Fourth, it adds to the literature on the effect of board compositions on stock price behaviour. The results of studies on the relationship between board composition and firm stock performance are inconsistent and the effectiveness of any board composition is vague (Byrd and Hickman 1992; Wen et al. 2002; Dahya and McConnell 2005; Lien et al. 2005; Abor 2007; Harford et al. 2008; Agrawal and Nasser 2012) and mainly focused on board size, board independence, board gender diversity and CEO duality (Ferreira et al. 2011; Gul et al. 2011; Ntow-Gyamfi et al. 2015; Sila et al. 2017). The study contributes to this field of literature by providing insight into the effect of directors' financial expertise on stock price synchronicity and the possibility of reducing stock price synchronicity through policies supporting the increase of financial expertise on board. Fifth, a substantial amount of literature examining how stock price crash risk is subjected to the amount of voluntary disclosure (Haggard et al. 2008), financial statement transparency (Hutton et al. 2009), top management equity incentive (Kim et al. 2011a), institutional investors (Callen and Fang 2013), large controlling shareholders (Boubaker et al. 2014) and CEO overconfidence (Kim et al. 2016), including other things. Thus, firm

crash risk is directly affected by firm corporate governance and informational environment. As promoted by new policies[26] and literature, financial expertise can bring better firm governance and information environment. This study introduces new evidence that the board of directors' financial sophistication has no effect on the firm crash risk. Finally, results offer empirical justification to the increasing calls by policymakers and academics for more financial-expert directors on boards to prevent accounting manipulations and frauds. To the best of the researcher's knowledge, this study is one of the few that have investigated the effect of financial-experts on firm information environment and the first to investigate the effect of financial-experts on firm stock price synchronicity

6.3. Financial experience on board and cash holding

Chapter 4 empirically analyses the impact directors with financial experience have on firms' cash holding. Further, analysis tests how the interaction between financial-expert directors and cash holding affects investment decisions, payout policies and firm profitability. Furthermore, the study analysed the effect financial-experts have on the value of cash holding**.**

The main finding of this chapter can be summarised as follows. First, the fraction of financial-expert directors has an inverse relationship to firms' cash holding. However, this relationship appears when the financial experience is defined as directors' previous experience in accounting related field. Results also show that the relationship was driven from the high fraction of accounting financial-experts reducing the firm level of cash reserves but not from the low fraction of accounting financial-experts on board increasing firm cash holding. Second, the study main results were tested through different cross-sectional groups and found that the effect of director financial-experts on limiting firm cash holding appears in financial constraint firms (small firm size and low payout ratio). However, using KZ Index, the effect of financial-experts on firm cash holding appears in financially unconstraint firm (low KZ Index). Moreover, concerning firm corporate governance, the effect of accounting financial-experts is more pronounced in firms with better board structure in terms of independence and board size. However, for CEO duality and E-Index

[26] the Sarbanes-Oxley (2002) Act

measure, the result of the fraction of accounting financial-experts on board is found on firms with high governance needs (firms with CEO duality and high E-Index measure). Third, the study found insufficient evidence that the fraction financial-experts on board affect firm investment decisions (capital expenditure, R&D or acquisition). However, the fraction of accounting financial-experts explains a large amount of the increase of firms' dividend payments in relation to firm excess cash holding. Fourth, testing the effect of firm excess cash holding on firm market-to-book ratio shows accounting financial-experts' ability to enhance firm profitability and market-to-book ratio from the firm change in excess cash holding. Fifth, the study tested the relationship of firm financial-experts on value of cash holding and, following Faulkender and Wang (2006) and Dittmar and Mahrt-Smith (2007) models, results suggest that there is insufficient evidence to support the argument that investors would value excess cash holding any differently in the presence of accounting financial-experts on board and very weak evidence to support the argument that investors would value excess cash more in the presence of non-accounting financial-experts on board.

This part of the study also contributes to the finance literature on the effectiveness of board financial expertise in several ways. First, the study main results indicate that financial directors play a significant role in monitoring and reducing the amount of firm cash holding. Principally, not all financial-expert directors are effective in this matter — only those with prior accounting financial experience. Second, the study results question the SOX Act description of financial experience, which includes "supervising" employees with financial reporting responsibilities. Directors with supervisory experiences failed to have a similar influence. Third, this study adds to the literature on board financial expertise effectiveness as most literature focuses on financial-experts on corporate audit committee or banks' boards (McDaniel et al. 2002; Davidson et al. 2004; Mangena and Pike 2005; Carcello et al. 2006b; Fernandes and Fich 2009; Minton et al. 2014), the new tendency towards increasing financial expertise on the board of directors allows the financial expertise perspective to become embedded into the corporate board of directors and adds to the growing literature on corporate board of directors' financial experience. Fourth, it adds to the literature on the board of directors' attributes effectiveness on cash holding. The results of existing studies on the relationship between board attributes and firm cash

holding focus on board independence, board size, CEO duality and board gender diversity (Chen 2008; Gill and Shah 2012; Boubaker et al. 2015; Atif et al. 2019). This study widens the range of board attributes effectiveness by adding the directors' financial experience as a determinant on the level of firm cash holding. Fifth, this study adds to the traditional financial theory flexibility hypothesis claiming that managers prefer to retain firm earnings to have the flexibility of financing investments and to minimise the need to raise money externally, which employs additional monitoring to top management. This study shows that enhancing board of directors' composition through the appointment of more financial-experts on board enhances shareholders' power over managers, limiting their ability to retain more cash instead; they influence firm excess cash to be distributed to shareholders in the form of dividends. Finally, this study adds to the literature on board of directors' effect on firm profitability. Previous literature shows the effective influence of board directors on firm performance mainly focused on board independence, board size, CEO duality and board gender diversity (Rechner and Dalton 1991; Erhardt et al. 2003; Krivogorsky 2006; Yan Lam and Kam Lee 2008; Belkhir 2009; Yang and Zhao 2014; Kakabadse et al. 2015). This study shows the ability of financial-experts on board to enhance firm profitability and market-to-book ratio from the firm excess cash holding.

6.4. Financial experience on board and payout policy

Chapter 5 empirically studies the impact that directors with financial experience have on firm payout policy. Further analysis tested the study main findings against different firm settings based on their corporate governance strength and financial constraints position. Moreover, directors also decide on different types of payout policies. The study investigates the effect of financial-experts on board on the chosen payout policy (dividend payments or repurchase).

The main finding of this chapter can be summarised as follows. First, in the case of enhanced corporate governance, through the appointment of financial-experts on board, using three different payout measures, financial-experts were found to have a positive effect on motivating managers to payout more to shareholders. However, this result only appears when the financial experience is measured by previous related accounting experience and not by supervising accounting experts. Second, a number of robustness checks were conducted: first, the main regression was repeated

controlling for other board of directors' composition (which also affects board monitoring and payout policy); second, the main regression was repeated excluding utility firms as they are subject to different financial policies and different governance regulations which might affect their payout policy. The study main findings are robust to controlling for board composition and excluding utility firms. Third, the results show that the effect of accounting financial-experts on increasing firm payouts is more prominent in firms with weak corporate governance mechanism (firm with high E-Index, CEO duality and large board size). However, the results are mixed based on firm board independence, depending on different payout measures. Moreover, in highly financially constrained firms, accounting financial-experts on board also play a major role in increasing the payout level of firms. This is in line with the study's main argument that directors' financial experience enhances board monitoring, reducing agency conflict of interest by increasing firm payouts when corporate governance in weak and financial constraint is high, particularly when managers' incentive to retain more cash is high. Finally, the fraction of accounting financial-experts on board would not only increase firm payout level, but would also be more likely to pay shareholders in the form of repurchase. This emphasises the financial-experts' role in enhancing board monitoring through the influence of distributing free cash flow through non-pre-committed shareholders payments.

This chapter makes several some notable contributions to prior literature on the effectiveness of board of directors' composition in a number of ways. First, the study's main results indicate that financial directors play a significant role in monitoring managerial decisions on payout policy. Specifically, not all financial-expert directors are useful in this matter — only those with prior accounting financial experience. Second, congruent with contributions in the previous two chapters, the study results challenge the financial-experts' definition under the SOX Act, which includes "supervising" employees with financial reporting responsibilities. Directors with supervisory experiences failed to have a positive effect. Third, this study adds to the growing literature on corporate board financial expertise effectiveness, aside from previous studies mainly focusing on financial-experts on banks or audit committees (McDaniel et al. 2002; Davidson et al. 2004; Mangena and Pike 2005; Carcello et al. 2006b; Fernandes and Fich 2009; Minton et al. 2014). Fourth, it adds to the literature on the board of directors' composition effectiveness on firm payout policy. The results

of existing studies on the relationship between board composition and firm payout policy mainly focus on board independence, board size, CEO duality and board gender diversity (Schellenger et al. 1989; Al-Najjar and Hussainey 2009; Byoun et al. 2016; Chen et al. 2017). This study sheds light on board effectiveness, measured by board financial experience, and the effect on firm payout policy. Fifth, the study's main results contribute to the compliment hypothesis, arguing that stronger corporate governance uses payout policy to mitigate agency conflict of interest by distributing free cash flow to shareholders minimising managers' misuse of free cash flow. Finally, the study adds to the determinants of different payout policy decisions (dividend payout and repurchase) and partially justifies the increase in firm share repurchase trend (on the expense of dividend payouts) through the appointment of financial-experts on board.

6.5. Research implications, limitations and future research

The main empirical findings of this thesis have several implications for research studies, corporations, investors and policymakers. For researchers' prospective work, as studies on board composition effectiveness provide little attention to directors' financial experience on corporate board, this study shows that financial experience plays a significant role in enhancing firm information environment and firm main financial decisions (cash holding and payout policy). Regarding corporate matter, firms make their daily decisions based on their going concern, taking under consideration the risk of bankrupts, fraud and accounting scandals. Chapter 3 results bring insight to firms on the possibility of improving their firm information environment through the appointment of financial-experts on board. Moreover, firms operate to increase their yearly profitability on investments. Chapter 4 shows that financial-experts on board extend the ability to enhance firm profitability from the firm excess cash holding.

Moreover, Chapters 3, 4 and 5 results should be particularly relevant to shareholders. Given the separation of ownership and control, it is essential for shareholders to have effective corporate governance that ensures top management decisions are in line with their interest. The main results of this thesis indicate financial-experts on board provide ability to enhance board monitoring over managers, which was found in enhancing firm information environment, cash holding decisions,

the profitability of firm excess cash holding, the level of firm payout and their chosen payout policy. Thus, results offer a good insight into the monitor effectiveness of appointing more financial-experts on board. In respect of policymakers, the study's empirical results challenge the SOX Act main definition of directors' financial experience, which includes "supervising" employees with financial reporting responsibilities. The study found that directors with previous CEO- and/or President-responsibility fail to have the same effectiveness on improving firm information environment and board monitoring over cash holding and payout policy decision. Thus, firms responding to the SOX Act for appointing financial-experts on audit committee through non-accounting financial-experts might not reach the desired board effectiveness.

On the limitation side of the study, some aspects should be noted. First, the study mainly focuses on two types of firm financial experience (accounting and non-accounting). However, directors may acquire some financial knowledge through their educational background. Moreover, accounting financial-experts are identified by four previous types of related financial experience: (1) banking institution executive; (2) financial institution (non-bank) executive; (3) finance-related position of non-financial firms (CFO, Accountant, Treasurer, Vice President for Finance. etc.); and (4) professional investor. It is worth investigating whether financial education background has a similar effect on financial experience and whether different types of accounting financial experience matter in effect on firm stock price synchronicity, cash holding and payout policy. Second, the study results on directors' financial experience effect on stock price synchronicity and payout policy is limited to non-financial firms and results on directors' financial experience effect on firm cash holding are limited to non-financial and non-utility firms due to different financial policies and different governance regulations. Thus, to gain a broader insight into the effect of financial-experts on board, it would be worthwhile investigating, in a separate sample, the financial-experts' effect on firm stock price synchronicity and payout policy in financial firms and financial-experts' effect on firm cash holding in finance and utility firms. Third, literature illustrates different ways of measuring firm stock price informativeness. This study focuses solely on firm stock price synchronicity. For future research, it would be of benefit to investigate whether the relationship stands in

other stock price informativeness measures (e.g. firm-specific return variations measure).

Finally, this study opens avenues for future research. First, the study mainly focuses on the US financial market, which is considered a developed market with high shareholder protection. Future study may test the financial-experts' effect in emerging markets, where shareholder protection is low and corporate governance is weak. Second, the study mainly relies on secondary data. A better insight into directors' financial experience might be detected through a questionnaire survey or an interview survey (or both) with firm board of directors' members. Third, establishing the relationship between directors' financial experience and firm information environment and financial decision opens a wide range of possibilities on what type of effects do financial-experts have on other firm decision-making processes.

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