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Audit committee financial expertise, gender, and earnings management: Does gender of the financial expert matter?

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ABSTRACT

The effectiveness of the presence of financial expertise on the audit committee (AC) in reducing earnings management has been the subject of many previous studies with mixed findings. This paper suggests that the mixed findings may be due to prior studies not distinguishing between the genders of the financial experts on the AC. We investigate how financial expertise affects earnings management taking into account the gender of the financial expert. We use the data of a sample of 5660 US firm-year observations from 2007 to 2013 which was analysed using least squares regressions clustering by firm. The results indicate that proportion of financial expertise on the AC and gender reduces earnings management. We then group the AC financial experts by gender, and examine whether the gender of the financial expert matters. The results show that the proportion of female financial experts on the AC is significantly associated with less earnings management while the proportion of male financial experts does not significantly affect earnings management; this suggests that previous studies indicating that the presence of a financial expert on the AC may have been influenced by gender of the female financial experts. Further, our findings may also partly explain the contradictory findings of prior studies on the effect of financial expertise on the ACs effectivness.

1. Introduction

Audit committee (AC) plays a key role in overseeing, monitoring and advising the management of an organization in implementing internal accounting control systems and the preparation of financial statements (Arun, Almahrog, & Aribi, 2015; Bédard & Gendron, 2010; Sun, Liu, & Lan, 2011). According to Klein (2002), in their role as overseers of the firm's financial reporting process, members of the AC meet regularly with the firm's managers and auditors to review the corporation's financial statements, audit process, and internal accounting controls. To improve the effectiveness of the AC following accounting scandals, such as the Enron Scandal in the US, there are now requirements in many countries for some members of the AC to have financial expertise (Badolato, Donelson, & Ege, 2014; Bédard & Gendron, 2010; Blue Ribbon Committee, 1999; General Accounting Office, 1991; Sarbanes-Oxley Act, 2002; Smith Committee, 2003).

The requirements for an AC to have a financial expert among its members has attracted considerable research as to whether such financial expertise makes a difference (e.g., Badolato et al., 2014; Bédard & Gendron, 2010; Carcello, Hollingsworth, Klein, & Neal, 2006; Dhaliwal, Naiker, & Navissi, 2010; Ismail & Abdullah, 2013). For example, Badolato et al. (2014) found that ACs with both financial expertise and high relative status are associated with lower earnings management. Qi and Tian (2012) also found that the presence of a financial expert on the AC reduces earnings management while Davidson, Xie, and Xu (2004) reported significant positive stock price reaction when new members of the AC have financial expertise. Although Albring, Robinson, and Robinson (2014) found that accounting expertise contributes to the AC's monitoring of auditor independence, they report that broader financial expertise is not an effective mechanism. A review article on the evidence of the effectiveness of financial expertise on aspects of financial reporting by Bédard and Gendron (2010) report that 57% of the studies identified found a positive association between financial expertise and ACs effectiveness, while 10% found a negative association and the remaining 33% indicated a non-significant association. Thus, on the evidence provided by Bédard and Gendron (2010), the effectiveness of financial expertise in curtailing financial reporting abuses is mixed.

There are a number of possible reasons for the conflicting results on the effectiveness of the AC ranging from sample size, statistical method

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used, time period, and country of study. In this study we suggest that the conflicting results may have been due to prior studies not distinguishing between the genders of the financial experts on the AC. This is because most existing studies investigating the monitoring role of financial expertise operationalize financial expertise as 'the presence' of a financial expert on the audit committee (e.g., Bédard, Chtourou, & Courteau, 2004; Carcello et al., 2006;Dhaliwal et al., 2010; Krishnan & Visvanathan, 2008; Liu, Tiras, & Zhuang, 2014; Yang & Krishnan, 2005) or the 'proportion of financial experts' on the AC (e.g., Albring et al., 2014; Badolato et al., 2014) without distinguishing whether the financial expert is 'female' or 'male'. It is, therefore, possible that the results which found that financial expertise constrains earnings management may be influenced by the 'gender' rather than 'financial expertise' of the AC member. If this suggestion is plausible, we would expect AC female experts to have a more pronounced effect on earnings management than their male counterparts would. Such a finding may also explain the contradictory results on the effectiveness of financial expertise. This is because the genders of the AC 'financial expert' used by extant research are likely to differ from one study to the other.

The objective of our study is to investigate the effect of the AC financial expertise and gender on earnings management. In particular, we seek to determine if gender of the financial expert matters in constraining earnings management. We first investigate the impact of AC financial expertise and gender as per existing literature. We then split financial experts from our sample of 5660 US firm years from 2007 to 2013 by gender into female financial experts and male financial experts and investigate how they affect earnings management. The findings suggest that financial expertise and gender are associated with less earnings management. When the financial experts are split by gender, the results show that the proportion of female financial experts on the AC is significantly associated with less earnings management. However, the proportion of male financial experts does not significantly affect earnings management.

Our study contributes to the existing literature in two main ways. First, our evidence suggests that existing research findings on the effectiveness of AC financial expertise in reducing earnings management (e.g., Badolato et al., 2014; Qi & Tian, 2012) may have been driven by female financial expertise. Second, the results of our study also contribute to existing literature by offering a plausible reason for the contradictory findings on the effectiveness of financial expertise as a monitoring mechanism (e.g., Badolato et al., 2014; Bédard & Gendron, 2010). We suggest that a possible reason for the contradictory results on the effectiveness of AC financial expertise is due to the differences in the gender of the financial expert across the different studies. Further, our study also contributes to the limited and contradictory evidence for the efficacy of gender on constraining earnings management (e.g., Ismail & Abdullah, 2013; Qi & Tian, 2012; Thiruvadi & Huang, 2011).

The rest of this paper is organized as follows. Section 2 reviews the literature and develops hypotheses on financial expertise, gender, and financial expertise by gender. Section 3 discusses the research method and data. While Section 4 discusses and presents the empirical findings, Section 5 reports our robustness checks. Finally Section 6 summarizes the research and draws some conclusions.

2. Literature review and hypotheses development

2.1. Theoretical framework

Bédard and Gendron (2010) found that most research on ACs was guided by legal and economic theories. According to legal theories, ACs should be effective because they need to fulfil their responsibilities required by law. Although the legal theories apply to our study, it is mostly guided by agency theory – the most prominent economics-based theory used to explain ACs effectiveness. The theory – mostly attributed to Jensen and Meckling's (1976) paper – suggests that agency costs arise because of the separation of ownership from control since managers as agents will not always act in the best interests of the principal (shareholders). To reduce the agency costs, the principal (shareholders) will incur monitoring costs. According to agency theory, monitoring expenditure allows the principal to better observe the agent's actions, thereby preventing the agent from taking the actions that the reduce firm's value (Gomez-Mejia & Wiseman, 1997; Tosi & Gomez-Mejia, 1989). These monitoring expenditures include costs of hiring board members who will then form subcommittees such as the AC. To be effective, the members of the AC are expected to have certain qualities such as financial expertise and diversity in terms of gender, which are the focus of this study.

A number of views are expressed in literature to explain why AC finance expertise and gender may improve monitoring effectiveness. For example, Harris and Raviv (2008) suggest that financial experts have lower costs of acquiring information about the complexity and associated risks of certain financial transactions and hence are able to efficiently monitor senior management. Gore, Matsunanga and Yeung (2011, p. 772) also suggest that 'while incentive to monitor is important, effective monitoring requires a high degree of specialised knowledge in order to evaluate managerial decisions. Without adequate financial training and experience, even motivated directors cannot determine whether the firm's financial policies are appropriate'. Krishnan and Visvanathan (2008) add that AC members with finance expertise enhance accounting conservatism by their better monitoring capability-driven knowledge base, job expectation as demanded by audit committee charter, and economic incentives to mitigate the risk of litigation and protect reputational capital.

Regarding presence of women on the board, Adams and Ferreira (2009) suggest that their presence is likely to contribute to improved monitoring because they are not part of the 'old-boys' club', which puts them closer to independent directors. Moreover, by examining the monitoring intensity of women with respect to retention decisions and compensation contracts, Adams and Ferreira (2009) evince that women are stricter monitors than their male counterparts. Also, scholars have suggested that gender diversity facilitates effective monitoring by broadening expertise, experience, interests, perspectives and creativity (Erhardt, Werbel, & Shrader, 2003; Hoever, Van Knippenberg, Van Ginkel, & Barkema, 2012). Moreover, according to Chattopadhyay, George, and Shulman (2008), gender diversity may give rise to conflict due to lack of trust, and this is likely to increase scrutiny.

2.2. Prior studies and hypotheses development

2.2.1. Financial expertise

The financial background of board members represents one of the most widely investigated attribute that is of interest to regulators. For example, Beekes, Pope, and Young (2004) postulate that, to be efficient as a monitoring mechanism, directors should have enough monitoring incentives and understand the consequences of financial reporting decisions. Arguably, directors should be able to understand the consequences of financial reporting decisions if they have the required financial background. This helps them to understand the complexity of financial reporting, to identify and to ask questions which make managers think harder, to understand auditors' judgement, and to support the auditor in auditor-management disputes (DeZoort & Salterio, 2001; Kalbers & Fogarty, 1993; Levitt, 2000; Mangena & Pike, 2005; Zhang, Zhou, & Zhou, 2007).

Since the AC is responsible for the financial reporting process, board members who sit on the AC should have the skills, financial expertise and training required to fulfil their duties and investigate the reasonableness of CEO explanations. The importance of financial expertise is emphasised by SOX (2002) which states that directors should have the required experience in preparing and auditing financial statements and accounting for accruals, estimates, and reserves (Dhaliwal et al., 2010). Beasley, Carcello, Hermanson, and Neal (2009) note that one of the most crucial requirements for serving on the AC is that the directors

possess financial expertise. Extant literature suggests that the financial experience of AC members plays a crucial role in constraining aggressive accounting practices. For example, Abbott, Parker, and Peters (2004) and Agrawal and Chadha (2005) find a negative relationship between the probability of restatement and the presence of at least one member with financial experience. Similarly, Bédard et al. (2004) and Hossain, Mitra, Rezaee, and Sarath (2011) show that lower accruals-based earnings management is a characteristic of firms with at least one financial expert on the AC. Finally, Xie, Davidson, and DaDalt (2003) find that discretionary current accruals are negatively related to the proportion of outside directors with corporate or investment (and investment banker) background. These findings all suggest that the effect of the audit committee depends partially on its members' collective experience (Carcello et al., 2006). Consistent with prior studies, we hypothesize a relationship between financial expertise and earnings management as follows:

H_1. Financial expertise has a significant impact on earnings management.

2.2.2. Gender

The appointment of female directors is likely to enhance board independence and improve the shareholders' wealth. For example, it facilitates more informed decisions, enhances the decision-making process, and improves communication among board members (Bear, Rahman, & Post, 2010; Daily & Dalton, 2003). In addition, the appointment of female directors enhances the depth and breadth of discussion and deliberations, particularly those related to challenging issues (Huse & Solberg, 2006; Srinidhi, Gul, & Tsui, 2011; Stephenson, 2004). Adams and Ferreira (2009) argue that because female directors do not belong to 'old-boy' networks, they are more likely to provide greater oversight, monitoring, and independent thinking expected of independent directors. They exhibit better board attendance, undertake monitoring positions, and demand greater accountability from CEOs for bad performance (Gul, Srinidhi, & Ng, 2011). This close monitoring would reduce the information asymmetry at the board level and also encourage more public disclosure by curbing managers' use of insider information for their own benefit (Gul et al., 2011; Srinidhi et al., 2011) which would subsequently constrain managers' opportunism.

Westphal and Zajac (1995) show that managers select directors who are demographically like them in order that they attain their support and collude to acquire higher compensation. Therefore, the appointment of female directors might ensure demographic diversity of the board, which might enhance the board's monitoring function (Bear et al., 2010). Also female directors are more conservative and risk-averse than their male counterparts (Faccio, Marchica, & Mura, 2016; Huang & Kisgen, 2013; Martin, Nishikawa, & Williams, 2009; Powell & Ansic, 1997), and are therefore less likely to allow managerial opportunism for fear of being caught. Female directors are more ethically sensitive than males (e,g., Ibrahim, Angelidis, & Tomic, 2009; Lund, 2008; Owhoso, 2002; Simga-Mugan, Daly, Onkal, & Kavut, 2005) and are less tolerant towards managerial opportunism than male directors are.

Extant research also supports that firms with female representatives outperform their rivals. For instance, Gul et al. (2011) find that female directors are associated with richer information environment, and Nekhili, Nagati, Chtioui, and Nekhili (2017) show that corporate social responsibility (CSR) disclosure has more value-relevance for firms with gender-diversified boards than for other firms. Similarly, Gul, Hutchinson, and Lai (2013) showed that gender diversity adds to the transparency and accuracy of financial reports. They found that female directors are associated with more accurate and less dispersion of analysts' earnings forecasts. Using a sample for the period from 2003 to 2005, Sun et al. (2011) show that gender does not affect audit committees' effectiveness in constraining earnings management. However, their results should be interpreted with caution because the sample was limited to the period immediately after the passage of SOX when large US firms were under intense scrutiny over the role of audit committee in improving earnings management, which might have led to extra care being taken by both female and male directors. That is, during this period, there might be little evidence of the gender impact on directors' behaviors. Using a large sample over a period from 2001 to 2007, Srinidhi et al. (2011) find that firms with female representatives on the audit committee exhibit higher earnings management, which suggests superior monitoring ability of female directors. Following these arguments, we state our second hypothesis as follows:

H_2. Gender has a significant impact on earnings management.

2.2.3. Financial expertise by gender

The previous two hypotheses have discussed why financial expertise and gender may influence earnings management. In this section, we discuss why female financial experts are expected to have more influence on earnings management than male financial experts. In addition, we argue why both female and male financial experts are expected to have an impact on earnings management.

Bédard and Gendron (2010) call for studies to investigate how personal characteristics of board members, including financial expertise, influence their monitoring effectiveness. Dhaliwal et al. (2010) show that the monitoring capability of financial experts varies based on their independence, stock ownership, outside directorship, and tenure. Building on extant research, Srinidhi et al. (2011) demonstrate that female directors are more diligent, require better accountability for CEOs' performance, and are more likely to challenge CEOs' traditional practices and policies. Extending this argument, we suggest that, assuming the same level of financial expertise, AC female financial experts are more likely to have a more pronounced effect on earnings management than AC male financial experts.

Although AC female financial experts are expected to have a more pronounced effect on earnings management than their male counterparts, we expect that the proportion of AC female financial experts and AC male financial experts will individually have a significant influence on earnings management given that previous studies (e.g., Abbott et al., 2004; Agrawal & Chadha, 2005; Bédard et al., 2004; Hossain et al., 2011) show that ACs with a financial expert (presumably either female or male) significantly influence earnings management. Our final hypotheses are, therefore, stated as follows:

H_3. The proportion of female financial experts on the AC has a more pronounced impact on earnings management than proportion of male financial experts.

H_{3a}. The proportion of female financial experts on the AC has a significant impact on earnings management.

H_{3b}. The proportion of male financial experts on the AC has a significant impact on earnings management.

3. Method and data

3.1. Data

Financial statement data are obtained for the years 2007 to 2013 from the 2013 annual Compustat File. To avoid the immediate impact of SOX on directors' behavior towards earnings management, this study uses data collected from a more stable period following several years of the spate of US financial scandals and the introduction of SOX (i.e. from 2007). Thus, directors' concerns over accounting opportunisms might be lower during this period. Our study excludes financial firms due to their different financial reporting environments. To ensure sufficient data to run model (1), we exclude industries with less than 15 firm-year observations and exclude firms with missing data required for running model (1) (see Section 3.2). Financial data are then merged with female

directors and board of directors' data obtained from ISS (formerly RiskMetrics). Each firm-year observation should have the required data to calculate variables in model (2) (see Section 3.2) and, therefore, this study deletes any firm-year observations with missing governance or financial information required for the analysis. The resulting sample is 5660 firm-year observations with full data available over the period from 2007 to 2013.

3.2. Estimating earnings management

Extant research has used different methods to estimate earnings quality (i.e. less earnings management). For instance, Dechow and Dichev (2002) define it as the extent to which current year accruals are associated with previous, current and subsequent year operating cash flows, while Jones (1991) defines it as the extent to which accruals embedded in earnings are not opportunistically used by managers. However, McNichols (2002) develops a more rigorous estimation for earnings management by combining these two methods. Therefore, the current study uses a measure of earnings management based on discretionary accruals (DACC) measured using the expectation model proposed by McNichols (2002) as follows;

$$WCA_{i,t}/AT_{i,t-1} = \beta_0 + \beta_1 OCF_{i,t-1}/AT_{i,t-2} + \beta_2 OCF_{i,t}/AT_{i,t-1} + \beta_3 OCF_{i,t+1}/AT_{i,t} + \beta_4 \Delta SALES_{i,t}/AT_{i,t-1} + \beta_5 PPE_{i,t}/AT_{i,t-1} + \varepsilon_{it}, \quad (1)$$

where *WCA* is working capital accruals measured as the (change in current assets - change in cash) – (change in current liabilities - change in the current portion of long-term debt).[1] OCF refers to cash flows from operations in year t, t − 1, and t + 1. Δ*SALES* refers to the change in sales. *PPE* is the gross property, plant, and equipment. DACC for each firm is then estimated as the residuals from Eq. (1) run annually for each two-digit SIC industry with at least 15 observations. Following Srinidhi et al. (2011), the current study focusses on the absolute value of residuals (ABS_DACC) where its high value indicates high earnings management level.

Then, we estimate Eq 2 to test our first and second hypotheses. Eq 2 is developed so that it includes our primary variables of interest which are ABS_DACC, financial expertise (EXPERT), Audit committee female directors (ACFD). Beyond these variables, we reviewed other studies (e.g., Arun et al., 2015; Peasnell, Pope, & Young, 2005; Zalata & Roberts, 2016) on earnings management to determine other variables which have been found to influence earnings management that we needed to control for.

$$ABSDACC = \beta_0 + \beta_1 EXPERT + \beta_2 ACFD + \beta_3 BSIZE + \beta_4 ACSIZE + \beta_5 IND + \beta_6 OWN + \beta_7 TEN + \beta_8 OUT + \beta_9 BIG4 + \beta_{10} SIZE + \beta_{11} LEV + \beta_{12} OCF + \beta_{13} ROA + \beta_{14} LOSS + \beta_{15} MBV + \beta_{16} NOA + \beta_{17} SALEG + \beta_{18} REM, \quad (2)$$

where ABS_DACC is the absolute value of discretionary accruals (DACC). EXPERT refers to the proportion of financial expert directors serving on the audit committee. Following Armstrong, Blouin, Jagolinzer and Larcker (2015), we consider the director as a financial expert based on the definition provided by the Institutional Shareholder Services (ISS) database.[2] ACFD is the proportion of female directors on the audit committee. Similar to prior studies and consistent with the first and second hypothesises (H_1 and H_2), we expect β_1 and β_2 to be negative. However, the effectiveness of directors might be subsumed by other observable governance quality (Srinidhi et al., 2011). Prior studies (Peasnell et al., 2005; Zalata & Roberts, 2016) show that earnings management is a common characteristic of companies with weak corporate governance. Therefore, the current study controls for other governance characteristics that might influence the ability of financial expertise in improving earnings management. These characteristics include: Board size (BSIZE) and audit committee size (ACSIZE) measured as number of directors on the board and audit committee, respectively. Large board and audit committee are more likely to include independent members with diversified experience that are more likely to challenge managers' opportunistic practices and therefore improve earnings quality. Independent directors (IND) measured as the percentage of independent directors to the total number of directors on the board. We expect IND to be more concerned about improving their reputation as experts in monitoring management, and therefore less likely to allow opportunistic decisions. We also include non-executive directors' stock ownership (OWN) measured as the proportion of shares held by independent directors to the total outstanding shares. Arguably, OWN might align their interests with shareholders' interests and therefore they are more likely to scrutinize managers' decisions. On the other hand, OWN might motivate them to collude with managers in order to achieve some personal benefits. Non-executive directors' tenure (TEN) measured as the average number of years during which the independent directors were serving on the board is also included. We expect that long serving time on the board would improve directors' knowledge of their firm's operations and resources and therefore they are less likely to be dependent on managers on getting the required information. That is, we expect that directors with long tenure are more likely to be vigilant and exercise close scrutiny over managers' actions. Non-executive directors' outside directorships (OUT) measured as the average number of outside directorships held by independent directors was also included because directors with additional outside directorships are more likely to gain the required governance expertise and knowledge of best practice (Bédard et al., 2004). Finally, we control for Big 4 auditor (BIG4) measured as a dummy variable set to one if the firm is audited by one of the Big 4 auditors and zero otherwise. Extant research suggests that firms audited by big auditors have less accruals-based manipulation.

Besides these governance characteristics, following Arun et al. (2015) and Ittonen, Vähämaa, and Vähämaa (2013), we also add other variables to control for other factors that have been found to be useful predictors of firms' discretionary accruals. These include firm size (SIZE) measured as the natural logarithm of market capitalization value. Larger firms face high pressure to report more accurately, and prior studies (e.g., Dechow & Dichev, 2002) show that small companies are associated with reporting lower accruals quality. Arguably, troubled companies have higher motivation to engage in downward earnings management (DeAngelo, DeAngelo, & Skinner, 1994; Ittonen et al., 2013) and, therefore, LEV, OCF, ROA, and LOSS are used as proxies for firms' financial condition; where LEV refers to Leverage measured as the long-term debt scaled by total equity, OCF is operating cash flows measured as operations cash flows divided by lagged total assets, ROA is return on assets measured as net income scaled by lagged total assets, and LOSS is an indicator variable set to one if the net income is negative and zero otherwise. Extant research suggests that growth firms are motivated to inflate their earnings to meet/beat analysts' expectations

[1] Since managers have more discretion over working capital accrual, we focus our analysis on it.

[2] Firms must disclose whomever is designated to be a financial expert and ISS identify who is the financial expert based on their bio. It seems that ISS follow the SOX and SEC definition. We therefore follow this definition for two reasons.

a) To be consistent with the regulatory language (Hayes, 2014).
b) The findings of Dhaliwal et al. (2010) suggest that diverse skills are valuable and are more associated with high earnings quality.

(i.e. McVay, 2006) and, therefore, Market-to-Book value (MBV) is used as a proxy for growth. MBV is measured as the proportion of market value to book value of equity. Firms' ability to engage in more accruals-based earnings management is constrained by the extent to which they have already managed their earnings in the last year (Fan, Barua, Cready, & Thomas, 2010). Barton and Simko (2002) measure last year's accruals-based earnings management using lagged net operating assets divided by sales (NOA). Therefore, we control for NOA. Net operating asset is the difference between operating assets and operating liabilities. Operating assets are calculated as total assets less cash and cash equivalents. Operating liabilities are calculated as total assets less total debt, less book value of common and preferred equity, less non-controlling interests.

Moreover, firms with high sales growth might be less transparent and thus more difficult to audit, which might provide them with greater ability to manipulate; therefore, following Ittonen et al. (2013) and Srinidhi et al. (2011), we control for sales' growth (SALEG) measured as percentage change in sales. Prior studies also show that firms might use accruals earnings management and real earnings management (REM) as a substitute. Therefore, this study controls for *cutting discretionary expenditure*.[3]

Finally, the following model is then used in testing our hypotheses (H_3, H3a, and H3b):

$$\begin{aligned} \text{ABS}DACC = {} & \beta_0 + \beta_1 \text{FEMEX} + \beta_2 \text{MALEEX} + \beta_3 \text{BSIZE} + \beta_4 \text{ACSIZE} \\ & + \beta_5 \text{IND} + \beta_6 \text{OWN} \\ & + \beta_7 \text{TEN} + \beta_8 \text{OUT} + \beta_9 \text{BIG4} + \beta_{10} \text{SIZE} + \beta_{11} \text{LEV} \\ & + \beta_{12} \text{OCF} + \beta_{13} \text{ROA} + \beta_{14} \text{LOSS} + \beta_{15} \text{MBV} \\ & + \beta_{16} \text{NOA} + \beta_{17} \text{SALEG} + \beta_{18} \text{REM}, \end{aligned} \tag{3}$$

where FEMEX is the proportion of AC female financial expertise directors, while MALEEX is the proportion of AC male financial expertise directors.

Since we are using panel data of seven years, the residuals might be biased and suffer from cross-sectional correlation and time-series correlation. Following Frankel, McVay, and Soliman (2011), Kolev, Marquardt, and McVay (2008) and Petersen (2009), we estimate least squares regressions and allow standard errors to be clustered by firms to control for cross-sectional correlation, and include year dummies to control for time-series correlation.[4]

4. Results

4.1. Descriptive statistics

Table 1 summarizes the descriptive statistics for our variables. While Panel A summarizes the descriptive statistics for the full sample, Panel B summarizes the descriptive statistics for two samples; a sample of firms with at least one female financial expert and a sample of firms with no female financial expert directors on their audit committees. Panel A shows that the average proportion of female financial expert directors is about 5% while the proportion of male experts is 44%. The mean of ABS_DACC is 0.09 in the full sample. In addition, Panel B shows that of the full sample 1070 firm-year observations, or 19%, have at least one female financial expert director. The mean ABS_DACC is 0.06 for firms with at least one female expert director compared with 0.09 for firms with no female experts (see Table 1, Panel B). The results show that these two groups are significantly different regarding ABS_DACC. Panel B also indicates that there are significant differences between these two groups regarding SIZE, LEV, LOSS, MBV, SALEG and REM. It seems that firms with strong internal corporate governance – in terms of BSIZE, ACSIZE, IND, TEN, OUT and BIG4 – are more likely to appoint female expert directors.

Table 2 presents the Pearson correlation matrix among ABS_DACC, FEMEX, MALEX and other independent variables used in the analysis. The association between ABS_DACC and both FEMEX and MALEX is negative and significant at 1% and 5%, respectively. However, these are preliminary results, and conclusions can only be drawn after controlling for other factors that might affect the quality of earnings. In general, there is no potential multicollinearity issue in our analysis as presented in Table 2.

4.2. Multivariate analysis

Table 3 presents our regression analysis with ABS_DACC as a dependent variable. Under Model 1, similar to prior studies (Bédard et al., 2004; Hossain et al., 2011; Labelle, Gargouri, & Francoeur, 2010; Srinidhi et al., 2011; Thiruvadi & Huang, 2011; Yang & Krishnan, 2005), we use measures that capture financial experts (EXPERT) and gender or female directors (ACFD) on the audit committee, while under Model 2 we focus on our two variables of interest; namely, female financial expert (FEMEX) directors and male financial expert (MALEX) directors.[5]

Consistent with prior studies (Bédard et al., 2004; Hossain et al., 2011), the estimated coefficient on EXPERT is significantly negative at 10% demonstrating that financial expert directors mitigate, to some extent, earnings management, which is consistent with our H_1. In line with Labelle et al. (2010), Srinidhi et al. (2011) and Thiruvadi and Huang (2011), the estimated coefficient on ACFD, as presented in Table 3, is also negative and significant at 10% thereby supporting, to some extent, the proposition that firms with female directors are more likely to report less earnings management, confirming H_2.

Interestingly, while Table 3, Model 2, shows that the coefficient on FEMEX is negative and significant at 5%, it shows an insignificant negative relationship between ABS_DACC and MALEX,[6] suggesting that female financial experts are more able to mitigate earnings management than their male counterparts are. Furthermore, Panel B of Table 3 shows a significant difference between the coefficients on FEMEX and MALEX, suggesting that female financial experts are more able to constrain earnings management than their male counterparts are, hence supporting H_3 that female financial expertise has a more pronounced impact on aggressive accruals-based manipulation than that of their male counterparts. The significance of FEMEX and insignificance of MALEX, respectively, means that hypothesis H3a is supported while hypothesis H3b is not supported.

The previous regression estimations are based on the absolute value of discretionary accruals as a proxy for earnings management. To further examine the impact of female and male financial expert directors upon earnings management, this study also differentiates between upward and downward earnings management by dividing the sample

[3] Our proxy for cutting discretionary expenditure is adopted from the following equation developed by Roychowdhury (2006).

$\text{DISEX}_t / \text{AT}_{t-1} = \beta_0 + \beta_1 1 / \text{AT}_{t-1} + \beta_2 \text{Sales}_t / \text{AT}_{t-1} + e_{it,}$

where DISEX is the discretionary expenses defined as the total of selling, general and administrative expenses, research and development expenditure (R&D) and advertising. If R&D and advertising expenses data are missing while selling, general, and administrative expense data are available, R&D and advertising expenses are set to zero. Finally, AT is the total asset at the beginning of year and Sales is the total sales.

[4] It is acknowledged that other methods can be used to address the panel data problems. However, Petersen (2009) who examined different techniques that have been used in the literature to address panel data problems (including fixed effects, generalized least-squares (GLS) estimation of a random effects model, and adjusted Fama-MacBeth standard errors) shows that out of the most common approaches, only clustered standard errors are unbiased.

[5] The rest of the analysis will use this measure.

[6] Albeit insignificant, this negative relationship between ABS_DACC and MALEX provides moderate support to our expectation that male experts are better able to decrease earnings management than other directors with no financial experts.

Table 1
Descriptive statistics.

Panel A: Descriptive statistics for the full sample

Variables	Mean	Median	Std Dev	Q1	Q3
ABS_DACC	0.09	0.03	0.18	0.01	0.07
EXPERT	0.49	0.4	0.32	0.25	0.75
ACFD	0.12	0	0.16	0	0.25
FEMEX	0.05	0	0.12	0	0
MALEX	0.44	0.33	0.31	0.25	0.67
BSIZE	8.9	9	2.03	7	10
ACSIZE	3.71	4	0.94	3	4
IND	0.79	0.8	0.11	0.71	0.88
OWN	0.02	0.01	0.05	0	0.01
TEN	9.43	9.08	3.43	7	11.33
OUT	0.91	0.88	0.51	0.5	1.27
BIG4	0.93	1	0.26	1	1
SIZE	7.72	7.54	1.54	6.58	8.73
LEV	0.49	0.28	0.9	0	0.63
OCF	0.13	0.12	0.08	0.08	0.17
ROA	0.07	0.06	0.08	0.03	0.11
LOSS	0.14	0	0.35	0	0
MBV	2.97	2.23	2.75	1.44	3.47
NOA	0.7	0.53	0.66	0.32	0.86
SALEG	0.07	0.06	0.2	− 0.01	0.15
REM	− 0.06	− 0.05	0.48	− 0.18	0.08

Panel B: Descriptive statistics comparing firms with at least one female expert and firms with no female expert on the audit committee

Variable	Firms with at least one female expert (N = 1070)			Firms with no female expert (N = 4590			Test of difference between means	
	Mean	Median	Std Dev	Mean	Median	Std Dev	t-Statistic	P value
ABS_DACC	0.06	0.03	0.14	0.09	0.03	0.19	3.572	0.0004
BSIZE	9.78	10	1.89	8.69	9	2.01	− 16.0659	0.0000
ACSIZE	3.96	4	0.96	3.66	3	0.93	− 9.4851	0.0000
IND	0.81	0.83	0.1	0.78	0.8	0.11	− 7.5237	0.0000
OWN	0.02	0	0.06	0.02	0.01	0.05	− 0.0342	0.9727
TEN	9.14	8.9	3.04	9.5	9.13	3.51	3.1152	0.0018
OUT	1.03	1	0.49	0.88	0.83	0.52	− 8.912	0.0000
BIG4	0.98	1	0.13	0.91	1	0.28	− 8.0251	0.0000
SIZE	8.33	8.29	1.57	7.58	7.39	1.49	− 14.6567	0.0000
LEV	0.63	0.44	0.95	0.46	0.24	0.88	− 5.3471	0.0000
OCF	0.13	0.12	0.08	0.13	0.12	0.08	1.5104	0.1310
ROA	0.07	0.06	0.07	0.06	0.07	0.09	− 0.5035	0.6147
LOSS	0.12	0	0.32	0.14	0	0.35	2.0451	0.0409
MBV	3.12	2.35	2.97	2.93	2.19	2.69	− 2.0463	0.0408
NOA	0.71	0.52	0.68	0.7	0.54	0.65	− 0.4501	0.6526
SALEG	0.06	0.04	0.17	0.08	0.06	0.2	3.0197	0.0025
REM	− 0.03	− 0.04	0.5	− 0.06	− 0.05	0.48	− 1.7215	0.0852

Variable definition:
ABS_DACC: absolute value of discretionary accruals as the residual from Eq. (1).
FEMEX: proportion of female financial expert directors to the total number of audit committee members.
MALEX: proportion of male expert directors to the total number of audit committee members.
BSIZE: board size measured as the total number of directors on the board.
ACSIZE: audit committee size measured as the total number of directors on the audit committee.
IND: independent directors measured as the proportion of independent directors to the total number of directors on the board.
OWN: non-executive directors' share of ownership measured as the proportion of the number of shares held by non-executives to the total outstanding shares at the year-end.
TEN: non-executive directors' tenure measured as the average number of years during which the non-executive directors were active on the board.
OUT: non-executive directors' outside directorships measured as the average number of outside directorships held by non-executive directors.
BIG4: Big4 auditor measured as indicator variable set to one if the audit firm is big4, and zero otherwise.
SIZE: the natural log of firms' market capitalization value.
LEV: leverage measured as the long-term debt scaled by common equity.
OCF: cash flows from operations scaled by lagged total assets.
ROA: return on assets measured as net income divided by lagged total assets.
LOSS: indicator variable set to one if the firm reports net loss, and zero otherwise.
MBV: market-to-book value ratio measured as market capitalization divided by book value of common equity.
NOA: lagged net operating assets divided by sales.
SALEG: percentage change in sales.
REM: is a proxy for real earnings management.

using the sign of DACC. As reported in Table 4, the coefficient of FEMEX is significantly negative at 1% in the first model with positive DACC and at 10% in the second model with absolute value of negative DACC, suggesting that female financial experts constrain both income-increasing and income-decreasing earnings management. However, Table 4 still shows an insignificant relationship between MALEX and

Table 2
Correlation matrix.

	ABS_DACC	EXPERT	ACFD	FEMEX	MALEX	BSIZE	ACSIZE	IND	OWN	TEN
ABS_DACC	1									
EXPERT	−0.05***	1								
ACFD	−0.03*	0.02*	1							
FEMEX	−0.04***	0.32***	0.64***	1						
MALEX	−0.03**	0.93***	−0.23***	−0.05***	1					
BSIZE	−0.07***	0.10***	0.26***	0.17***	0.04***	1				
ACSIZE	−0.05***	−0.11***	0.17***	0.04***	−0.13***	0.43***	1			
IND	−0.02	0.07***	0.12***	0.08***	0.05***	0.18***	0.26***	1		
OWN	0.00	−0.01	−0.02	−0.01	0.00	0.02*	−0.04***	−0.12***	1	
TEN	−0.02	−0.02	−0.08***	−0.05***	0.00	0.01	0.03**	−0.21***	0.10***	1
OUT	−0.03**	0.08***	0.14***	0.10***	0.04***	0.30***	0.20	0.27***	−0.09***	−0.19***
UDIT	−0.02*	0.08***	0.15***	0.10***	0.05***	0.23***	0.11***	0.16***	−0.05***	−0.07***
SIZE	0.02*	0.10***	0.19***	0.16***	0.04***	0.52***	0.26***	0.21***	−0.15***	−0.03**
LEV	−0.03***	0.05***	0.10***	0.06***	0.03**	0.16***	0.12***	0.11***	0.00	−0.05***
OCF	0.13***	−0.03**	−0.02	−0.02	−0.03**	−0.04***	−0.04***	−0.02*	−0.03***	−0.01
ROA	0.09***	−0.03**	0.01	0.00	−0.04***	0.02*	0.02	−0.02	−0.05***	0.05***
LOSS	−0.03**	0.02	−0.03*	−0.02*	0.03**	−0.08***	−0.06***	−0.01	0.06***	−0.05***
MBV	0.14***	−0.02	0.07***	0.02	−0.03**	0.04***	0.02*	0.08***	−0.03**	−0.02*
NOA	−0.07***	0.03**	−0.05***	0.00	0.03**	0.01	0.03**	0.00	−0.04***	0.00
SALEG	0.06***	−0.06***	−0.04***	−0.04***	−0.05***	−0.05***	−0.03**	−0.06***	−0.03**	−0.03**
REM	0.05***	0.03**	0.01	0.03*	0.02*	0.00	−0.01	0.00	0.02	−0.02

	OUT	BIG4	SIZE	LEV	OCF	ROA	LOSS	MBV	NOA	SALEG	REM
ABS_DACC											
EXPERT											
ACFD											
FEMEX											
MALEX											
BSIZE											
ACSIZE											
IND											
OWN											
TEN											
OUT	1										
UDIT	0.18***	1									
SIZE	0.39***	0.25***	1								
LEV	0.10***	0.09***	0.08***	1							
OCF	−0.05***	0.00	0.23***	−0.11***	1						
ROA	−0.02	−0.03**	0.31***	−0.15***	0.66***	1					
LOSS	0.00	−0.02*	−0.28***	0.09***	−0.35***	−0.67***	1				
MBV	0.07***	0.01	0.28***	0.42***	0.36***	0.34***	−0.15***	1			
NOA	0.01	0.04***	0.12***	0.14***	−0.07***	−0.16***	0.07***	−0.18***	1		
SALEG	−0.06***	−0.03*	0.08***	−0.05***	0.25***	0.39***	−0.27***	0.16***	−0.07**	1	
REM	0.01	0.00	0.01	0.01	0.07***	0.03**	−0.01	0.10***	−0.05***	0.02	1

***, **, and * indicate significance at 1%, 5% and 10% levels in a two-tailed test, respectively.
All variables' definitions are given in Table 1.

Table 3
Association between female and male financial expert directors and earnings management.

Variables	Model 1		Model 2	
	Coefficient	t-Statistic	Coefficient	t-Statistic
EXPERT	− 0.014	− 1.81*		
ACFD	− 0.026	− 1.72*		
FEMEX			− 0.059	− 2.4**
MALEX			− 0.008	− 0.79
BSIZE	− 0.004	− 2.64***	− 0.004	− 2.04**
ACSIZE	− 0.002	− 0.77	− 0.003	− 0.63
IND	− 0.023	− 0.98	− 0.024	− 0.79
OWN	0.028	0.69	0.029	0.56
TEN	− 0.002	− 2.19**	− 0.002	− 1.59
OUT	− 0.002	− 0.41	− 0.002	− 0.32
BIG4	− 0.001	− 0.09	− 0.001	− 0.11
SIZE	0.001	0.33	0.001	0.28
LEV	− 0.014	− 3.51***	− 0.014	− 2.88***
OCF	0.211	4.79***	0.210	4.17***
ROA	− 0.062	− 1.09	− 0.062	− 0.89
LOSS	0.011	1.25	0.011	0.99
MBV	0.008	4.9***	0.008	3.77***
NOA	− 0.012	− 2.89***	− 0.011	− 2.05**
SALEG	0.013	0.92	0.013	0.85
REM	0.017	3.43***	0.017	3.76***
Constant	0.149	6.07***	0.148	4.91***
Year fixed effect	YES		YES	
Adj_R2	0.080649		0.081131	
F	11.99		8.49	
OBS	5660		5660	
Panel B: Testing the significant differences between male and female financial experts				
FEMEX > MALEX			− 0.051	F = 4.33 Prob > F = 0.0376

***, **, and * indicate significance at 1%, 5%, and 10% levels in a two-tailed test, respectively.
All variables' definitions are given in Table 1.

Table 4
Association between female and male financial expert directors and upward and downward earnings management.

Variables	Positive DACC		Negative DACC	
	Coefficient	t-Statistic	Coefficient	t-Statistic
FEMEX	− 0.059	− 2.65***	− 0.051	− 1.74*
MALEX	− 0.002	− 0.24	− 0.011	− 0.88
BSIZE	− 0.006	− 3***	− 0.003	− 1.23
ACSIZE	0.001	0.23	− 0.004	− 0.95
IND	− 0.033	− 1.04	− 0.019	− 0.5
OWN	0.077	1.23	− 0.041	− 0.66
TEN	− 0.002	− 1.51	− 0.001	− 1.25
OUT	0.003	0.45	− 0.006	− 0.74
BIG4	− 0.018	− 1.25	0.014	0.92
SIZE	0.002	0.81	− 0.002	− 0.41
LEV	− 0.007	− 1.41	− 0.019	− 2.72***
OCF	0.210	4.03***	0.168	2.33***
ROA	− 0.114	− 1.45	0.032	0.36
LOSS	0.012	0.96	0.016	1.17
MBV	0.006	2.71***	0.010	3.48***
NOA	− 0.022	− 2.76***	0.000	0.07
SALEG	0.002	0.13	0.024	0.93
REM	− 0.016	− 3.11***	0.051	5.94***
Constant	0.169	5.01***	0.138	3.5***
Year fixed effect	YES		YES	
Adj_R2	0.100271		0.115315	
F	6.66		6.21	
OBS	2727		2933	
Panel B: Testing the significant differences between male and female financial experts				
FEMEX > MALEX	− 0.057	F = 6.19 Prob > F = 0.0130	− 0.04	F = 1.95 Prob > F = 0.1629

***, **, and * indicate significance at 1%, 5%, and 10% levels in a two-tailed test, respectively.
All variables' definitions are given in Table 1.

earnings management in models with positive and negative DACC. In addition, Panel B still shows that female financial expert has a significant impact upon positive DACC than their male counterparts.

Our results suggest that the findings of prior studies which show a significant relationship between AC financial expertise on earnings management (e.g., Bédard et al., 2004; Hossain et al., 2011; Xie et al., 2003; Yang & Krishnan, 2005) may be driven by female financial experts. Specifically, we suggest that the data used by prior studies which found a significant relationship between AC financial expertise and earnings management could have consisted of female financial experts. Similarly, the contradictory results on the effectiveness of AC financial expertise reported by existing studies (see Bédard & Gendron, 2010) could also be explained in terms of the gender of the financial expert on the AC. This is on the basis that studies which used data with a female financial expert on the AC were likely to report a significant relationship while studies which used data with a male expert were likely to report a non-significant relationship.

Overall, these results demonstrate that despite the benefit of appointing financial expert directors, female financial experts improve the board's oversight and monitoring effectiveness and, therefore, are more likely to challenge CEOs' aggressive financial reporting decisions than their male rivals would. That is, the current study adds to our understanding of how the gender-personal characteristics of financial expert members affect their monitoring effectiveness. Such an understanding is essential in evaluating the desirability of legislation to prioritize the appointment of female financial expert directors.

Since female directors are more risk-averse, we expect that the above-reported results should be more pronounced in firms operating in litigious industries. Therefore, similar to Ho, Li, Tam, and Zhang (2015), we split the full sample into two groups based on whether the firm is confronting high litigation risk. Following Ho et al. (2015), if the firm belongs to industries with SIC codes of 2833–2836, 3570–3577, 3600–3674, 5200–5961, and 7370–7370, it is classified as facing high litigation risk. The results of this analysis are presented in Table 5. As expected, they show that, in high litigious industries, FEMEX is negative and significant at 1%, while MALEX is negative but still insignificant. On the other hand, Table 5 shows no significant relationship between ABS_DACC and both FEMEX and MALEX in firms with lower litigation risk. These results demonstrate that female financial experts are more likely to challenge CEOs' financial reporting decisions and thus decrease earnings management, particularly in highly litigious industries. Furthermore, Panel B of Table 5 shows significant differences between the coefficients on FEMEX and MALEX in litigious industries, suggesting that litigation risk motivates female financial expert directors to exert close monitoring to avoid possible reporting failures.

Overall, the results in Tables 3, 4 and 5 provide considerable evidence to suggest that female financial expert directors are associated with less earnings management, implying that these directors are more likely to mitigate excessive financial reporting opportunism in their firms than their male counterparts are. In addition, this study finds evidence suggesting that female financial expert directors decrease the extent of earnings management when their companies face high litigation risk. However, there is no similar evidence in firms facing lower risk.

5. Robustness analyses

5.1. Performance-adjusted accruals

Under the main analysis, we used discretionary accruals (DACC) estimated based on McNichols' (2002) model as a proxy for earnings management. Extant literature has also measured earnings management based on the adjusted-for-performance Jones' (1991) model. We, therefore, adopt a measure of earnings management based on Jones' model as follows;

Table 5
Association between female and male financial expert directors and earnings management in high and low litigious industries.

Variables	High litigious industries		Low litigious industries	
	Coefficient	t-Statistic	Coefficient	t-Statistic
FEMEX	− 0.160	− 2.99***	0.010	0.48
MALEX	− 0.015	− 0.69	− 0.001	− 0.15
BSIZE	− 0.008	− 1.63	0.001	0.33
ACSIZE	0.000	0.01	0.001	0.32
IND	− 0.030	− 0.45	− 0.015	− 0.69
OWN	0.041	0.38	− 0.040	− 1.24
TEN	− 0.004	− 2.42**	0.001	0.7
OUT	0.009	0.63	− 0.002	− 0.37
BIG4	0.003	0.11	− 0.006	− 0.42
SIZE	0.003	0.39	− 0.005	− 2.38**
LEV	− 0.023	− 2.66***	− 0.002	− 0.46
OCF	0.241	2.07**	0.150	3.74***
ROA	0.045	0.32	− 0.091	− 1.9*
LOSS	0.012	0.51	− 0.003	− 0.41
MBV	0.012	3.22***	0.003	1.31
NOA	0.023	0.84	− 0.014	− 4.13***
SALEG	− 0.028	− 0.71	0.030	2.07**
REM	0.033	2.99***	0.000	0
Constant	0.170	2.69***	0.109304	3.9***
Year fixed effect	YES		YES	
Adj_R2	0.159911		0.033448	
F	8.75		3.18	
OBS	1987		3673	
Panel B: Testing the significant differences between male and female financial experts				
FEMEX > MALEX	− 0.145	F = 8.08 Prob > F = 0.0047	0.011	F = 0.22 Prob > F = 0.6360

***, **, and * indicate significance at 1%, 5%, and 10% levels in a two-tailed test, respectively.
All variables' definitions are given in Table 1.

Table 6
Association between female and male financial expert directors and earnings management; controlling for endogeneity.

Variables	ALL		Positive DACC		Negative DACC		High litigious industries		Low litigious industries	
	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
FEMEX	− 0.056	− 2.23**	− 0.055	− 2.41**	− 0.049	− 1.62	− 0.159	− 2.97***	0.015	0.67
MALEX	− 0.008	− 0.8	− 0.003	− 0.28	− 0.011	− 0.86	− 0.017	− 0.77	− 0.001	− 0.12
BSIZE	0.002	0.57	0.001	0.31	0.002	0.44	− 0.004	− 0.54	0.006	2.5**
ACSIZE	0.013	1.73*	0.019	2.51**	0.008	0.86	0.011	0.65	0.015	2.16**
IND	0.018	0.53	0.017	0.44	0.013	0.29	− 0.006	− 0.08	0.025	0.95
OWN	0.043	0.84	0.089	1.43	− 0.026	− 0.41	0.043	0.39	− 0.024	− 0.72
TEN	− 0.003	− 3.08***	− 0.004	− 3.03***	− 0.003	− 2.2**	− 0.006	− 2.44**	− 0.001	− 0.82
OUT	− 0.003	− 0.37	0.003	0.38	− 0.007	− 0.77	0.009	0.6	− 0.002	− 0.37
BIG4	0.002	0.11	− 0.015	− 1.05	0.017	1.08	0.005	0.19	− 0.004	− 0.26
SIZE	0.005	1.57	0.007	2.07**	0.002	0.53	0.006	0.77	− 0.002	− 0.62
LEV	− 0.013	− 2.66***	− 0.005	− 1.11	− 0.018	− 2.63***	− 0.021	− 2.43**	− 0.002	− 0.31
OCF	0.198	3.94***	0.198	3.8***	0.157	2.17**	0.235	2**	0.141	3.57***
ROA	− 0.052	− 0.76	− 0.106	− 1.38	0.043	0.48	0.053	0.37	− 0.087	− 1.79*
LOSS	0.010	0.9	0.011	0.84	0.015	1.12	0.014	0.57	− 0.005	− 0.63
MBV	0.007	3.58***	0.005	2.4**	0.009	3.4***	0.012	3.09***	0.003	1.17
NOA	− 0.012	− 2.06**	− 0.023	− 2.82***	0.001	0.09	0.022	0.81	− 0.015	− 3.95***
SALEG	0.002	0.1	− 0.012	− 0.82	0.015	0.59	− 0.033	− 0.81	0.019	1.33
REM	0.017	3.71***	− 0.015	− 3.01***	0.050	5.83***	0.033	3.01***	0.000	0.05
MILLS	0.080	2.35**	0.091	2.6***	0.065	1.51	0.051	0.68	0.073	2.56**
Constant	− 0.097	− 0.92	− 0.11074	− 1	− 0.05966	− 0.46	0.007428	0.03	− 0.11091	− 1.23
Year fixed effect	YES		YES		YES		YES		YES	
Adj_R2	0.083734		0.102877		0.117243		0.161772		0.036165	
F	8.3		6.48		6		8.6		3.1	
OBS	5660		2727		2933		1987		3673	
Panel B: Testing the significant differences between male and female financial experts										
FEMEX > MALEX	− 0.048	F = 3.67 Prob > F = 0.0556	− 0.052	F = 4.97 Prob > F = 0.0260	− 0.038	F = 1.65 Prob > F = 0.1989	− 0.142	F = 7.81 Prob > F = 0.0054	0.016	F = 0.39 Prob > F = 0.5308

***, **, and * indicate significance at 1%, 5%, and 10% levels in a two-tailed test, respectively.
All variables' definitions are given in Table 1.

$$WCA_{i,t}/AT_{i,t-1} = \beta_0 + \beta_1 1/AT_{i,t-1} + \beta_2 AdjSALES_{i,t}/AT_{i,t-1} + \beta_3 \Delta OCF_{i,t}/AT_{i,t-1} + \beta_4 I_{OCF,i,t} + \beta_5 \Delta OCF_{i,t}/AT_{i,t-1} \times I_{OCF,i,t} + \varepsilon_{it}. \quad (4)$$

where *Adj_SALES* is change in sales less changes in accounts receivable. ΔOCF refers to the changes in cash flows from operations and $I_{OCF,i,t}$ is an indicator variable that equals one if ΔOCF is negative, zero otherwise. While ΔOCF captures current year earnings news, $IOCF_{,i,t}$ and $\Delta OCF_{i,t} / A_{i,t-1} \times I_{OCF,i,}$ make Eq. (4) a piecewise linear model that controls for the asymmetric recognition of unrecognized gains and losses (Athanasakou, Strong, & Walker, 2011; Ball & Shivakumar, 2006). The discretionary accrual for each firm is then calculated as the residuals from Eq. (4) estimated annually for each two-digit SIC industry with at least 15 observations. Using this measure of earnings management, un-tabulated results still show that female financial experts are more associated with less earnings management (high earnings quality) than their male counterparts are.

5.2. Controlling for endogeneity

The results reported under the main analysis might be subject to potential self-selection bias if earnings management and female directors are endogenously determined; in this case, any conclusion drawn from our model might be misleading. Therefore, to deal with any potential endogeneity problem, we use a two-stage model as developed by Heckman's (1976) procedure. In the first-stage model, we compute the inverse Mills ratio (MILLS) from a probit model capturing the determinant of appointing female directors on the audit committee. This probit model controls for return on assets, firm size, sales growth, Tobin's Q, annual stock return, board size, audit committee size, the percentage of independent directors, stock ownership, average director tenure and average number of outside directorships. In addition, we include the ratio of female-to-male participation in the state where the firm is headquartered.[7] We expect that this variable will affect the appointment of female directors (Chen, Leung, & Goergen 2017) but not our dependent variable. In the second stage, MILLS is then added to Eq 3 as an additional control variable for endogeneity issues. We present the results of the second-stage regression in Table 6. It shows that the coefficient of female expert directors (FEMEX) is still negative and highly significant while MALEX is still negative but insignificant, suggesting that our results reported under the main analysis are not subject to self-selection bias.

5.3. Controlling for female directors

Extant research suggests that the participation of female directors on the board affects the level of earnings management (see for example, Arun et al., 2015; Srinidhi et al., 2011) and therefore, as a robustness test, we repeat our main analysis after controlling for the participation of female directors (FDir) on the board,[8] where FDir is measured as the percentage of independent female directors to total number of directors on the board. The results of this analysis are reported in Table 7 which still shows that female financial experts are more associated with high earnings quality than their male counterparts are.

5.4. Change to female financial expert

If our hypothesis (H_3) which states that female financial experts have more pronounced impact on earnings management than male financial experts is valid, we would expect to find improvement (deterioration) in accruals quality in the year after the appointment of female (male) financial expert directors. Consequently, 197 cases changing to female financial expert directors are identified as opposed to 528 cases changing to male expert directors. We then add two dummy variables (FEMEX and MALEX) that capture these changes to Model 3, where FEMEX is set to one when the firm transfers to a female financial expert director and zero otherwise, and MALEX is set to one when the firm transfers to a male financial director and zero otherwise. Un-tabulated results still show a significant negative relationship between FEMEX and discretionary accruals, and a negative but insignificant relationship between MALEX and discretionary accruals, thereby supporting the main results reported under the main analysis.

6. Conclusion

The paper investigated the influence of AC financial expertise and gender on earnings management using data from a sample of US firms from 2007 to 2013. In line with prior studies (e.g., Arun et al., 2015; Bédard et al., 2004; Gul et al., 2011; Hossain et al., 2011; Nekhili et al., 2017; Xie et al., 2003), we showed that financial expertise and gender are effective monitoring mechanisms. We then split our sample into female and male financial experts to investigate whether the gender of the financial expert matters. The results indicate that the proportion of female experts on the AC significantly reduce earnings management. However, we found no evidence of a similar effect from the proportion of male experts on the audit committee.

The results of the study contribute to existing literature as they suggest that previous results (e.g., Abbott et al., 2004; Agrawal & Chadha, 2005; Badolato et al., 2014; Qi & Tian, 2012) which indicate that AC financial expertise is an important monitoring mechanism in reducing earnings may be driven by AC female experts. The finding that only AC female experts constrain earnings management also makes an important contribution to the literature in that it offers a possible explanation for the conflicting findings on the effectiveness of financial expertise as a monitoring mechanism. Specifically, we suggest that previous studies which found that financial expertise is a significant monitoring mechanism may have used data consisting of AC female experts while those that reported no significant association could have used data with AC male financial experts. Finally, the study also contributes to the understanding of the effect of gender on earnings management since there are only a few yet contradictory studies to date (e.g., Ismail & Abdullah, 2013; Sun et al., 2011; Qi & Tian, 2012).

Our findings have important policy implications for the composition of the AC as they suggest that, when appointing financial experts to the AC, aiming for gender balance may reduce its effectiveness. The results imply that the higher the proportion of female financial experts on the AC, the more effective the committee is at restraining earnings management. On the contrary, the insignificance of the proportion of male financial expertise brings into question whether male financial expertise is needed as part of the AC.

Although we found no evidence that male financial expertise significantly influences earnings management, there is moderate evidence from separate analysis of our data (not documented) that female financial experts can better decrease earnings management than their male non-financial experts. Nonetheless, while we have used two different measures for accruals-based earnings management, similar to prior studies, our findings are still subject to measurement errors, and therefore we suggest that future studies might investigate whether these differences between male and female financial experts exist in other accounting contexts (i.e. earnings persistence, timeliness of loss recognition, characteristics of analyst's forecasts, or tax avoidance). In addition, we have followed a broader definition of the 'financial expert' and therefore future research might differentiate between accounting and non-accounting experts. Finally, we acknowledge that our results may not be applicable to other periods of time or other countries with different institutional settings.

[7] These data are available on the US Census Bureau website.
[8] We thank an anonymous referee for highlighting this point.

Table 7
Association between female and male financial expert directors and earnings management; controlling for female directors.

Variables	ALL		Positive DACC		Negative DACC		High litigious industries		Low litigious industries	
	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
FEMEX	− 0.060	− 2.3**	− 0.050	− 2.03**	− 0.060	− 1.89*	− 0.135	− 2.47**	− 0.006	− 0.25
MALEX	− 0.008	− 0.77	− 0.004	− 0.36	− 0.010	− 0.8	− 0.020	− 0.87	0.001	0.06
BSIZE	− 0.004	− 2.03**	− 0.005	− 2.69***	− 0.004	− 1.33	− 0.006	− 1.39	0.000	− 0.04
ACSIZE	− 0.003	− 0.63	0.001	0.21	− 0.004	− 0.98	0.001	0.09	0.001	0.34
IND	− 0.025	− 0.78	− 0.027	− 0.85	− 0.026	− 0.63	− 0.015	− 0.21	− 0.027	− 1.17
OWN	0.029	0.56	0.076	1.22	− 0.039	− 0.63	0.037	0.35	− 0.038	− 1.17
TEN	− 0.002	− 1.59	− 0.002	− 1.55	− 0.001	− 1.23	− 0.005	− 2.46**	0.001	0.76
OUT	− 0.002	− 0.32	0.004	0.46	− 0.006	− 0.74	0.010	0.69	− 0.002	− 0.36
FDir	0.006	0.14	− 0.041	− 0.9	0.042	0.73	− 0.124	− 1.25	0.075	2.01**
BIG4	− 0.002	− 0.12	− 0.017	− 1.17	0.013	0.85	0.005	0.19	− 0.008	− 0.6
SIZE	0.001	0.27	0.003	0.85	− 0.002	− 0.47	0.004	0.54	− 0.005	− 2.44**
LEV	− 0.014	− 2.88***	− 0.007	− 1.4	− 0.019	− 2.78***	− 0.023	− 2.62***	− 0.003	− 0.54
OCF	0.210	4.16	0.210	4.01***	0.170	2.34**	0.236	2.01**	0.151	3.78***
ROA	− 0.062	− 0.89	− 0.114	− 1.46	0.032	0.36	0.041	0.29	− 0.092	− 1.91*
LOSS	0.011	0.99	0.012	0.96	0.016	1.16	0.011	0.45	− 0.004	− 0.47
MBV	0.008	3.76***	0.006	2.73***	0.010	3.48***	0.012	3.22***	0.003	1.24
NOA	− 0.011	− 2.03**	− 0.023	− 2.86***	0.001	0.17	0.020	0.72	− 0.013	− 4.04***
SALEG	0.013	0.85	0.001	0.07	0.023	0.92	− 0.029	− 0.74	0.030	2.11**
REM	0.017	3.76***	− 0.015	− 3.08***	0.051	5.94***	0.033	3.08***	0.000	0.05
Constant	0.148	4.79***	0.163	4.91***	0.144	3.47***	0.150	2.34**	0.120	3.98***
Year fixed effect	YES		YES		YES		YES		YES	
Adj_R2	0.080974		0.100267		0.115226		0.160579		0.035198	
F	8.14		6.4		5.97		8.3		3.06	
OBS	5660		2727		2933		1987		3673	
Panel B: Testing the significant differences between male and female financial experts										
FEMEX > MALEX	− 0.052	F = 3.89 Prob > F = 0.0489	− 0.046	F) = 3.22 Prob > F = 0.0730	− 0.050	F = 2.52 Prob > F = 0.1125	− 0.115	F = 4.51 Prob > F = 0.0343	− 0.007	F = 0.06 Prob > F = 0.8088

***, **, and * indicate significance at 1%, 5%, and 10% levels in a two-tailed test, respectively.
All variables' definitions are given in Table 1.

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