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Audit committee gender diversity and financial reporting: evidence from restatements

Javad Oradi¹, Javad Izadi²

Abstract

Purpose – The main purpose of this study is to investigate the association between gender diversity on audit committees and the incidence of financial restatements.

Design/methodology/approach – Using a sample of 683 firm-year observations from Iranian listed companies for the period from 2013 to 2017, this paper uses a logistic regression model to examine a research hypothesis related to the association between the presence of female directors on the audit committee and the incidence of financial restatements.

Findings – After controlling for other restatement-related factors, we found that the presence of at least one female director on audit committees reduces the likelihood of the incidence of financial restatements. Robustness tests also confirmed this result. Moreover, we found that independent and financial expert female directors on audit committees are more strongly associated with a reduction in financial restatements. Finally, our additional analysis suggests that, in firms with gender diversity on audit committees and also the presence of independent and financial expert female directors, the likelihood of hiring auditors of a higher quality increases. Generally, the findings are consistent with the literature on gender diversity which suggests that women perform better in a monitoring role, are more conservative and make more ethical decisions.

Practical implications – The findings of this study could help with the understanding of broader participation of female directors on company boards and subgroups such as the audit committee, and of the improvement in corporate governance. Moreover, the findings can be of particular interest to monitoring authorities and policy makers in developing countries and send positive signals to them regarding the recommendation or requirement of gender diversity as a part of corporate governance mechanisms.

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Originality/value – The present study contributes to the extant literature by providing empirical evidence on the effect of audit committee gender diversity on financial restatements. Furthermore, this study provides evidence on the more effective oversight and greater ability of independent female directors and financial expert female directors, respectively; which has been significantly disregarded in the previous studies.

Keywords: Corporate governance, Audit committee gender diversity, Financial reporting, Restatement, Iran.

1. Introduction

The increasing prevalence of financial restatements has been given considerable attention by academia (Plumlee & Yohn, 2010). From the perspective of investors, restatements not only indicate problems of the previous period but also anticipate upcoming problems of the company and its management, which signal significant financial reporting weaknesses and can induce extreme market reaction (Akhigbe et al., 2005). In this regard, there is a growing research which demonstrates that good corporate governance can lead to a reduction in financial restatements and an improvement in financial reporting quality (e.g., Beasley, 1996; Abbott et al., 2004; Agrawal & Chadha, 2005; Abdullah et al., 2010). Audit committees as one of the most important corporate governance mechanisms, play a major role in improving the corporate performance and economic earnings (Anderson et al., 2004, Davidson et al., 2004; Dey, 2008) and ensure financial reporting quality (Klein, 2002). Moreover, audit committees monitor the internal controls and the risk management processes (Klein, 1998; Krishnan, 2005; Zhang et al., 2007), and also enhances the external auditor's independence and audit quality (Krishnan & Visvanathan, 2009; Chan et al, 2013; Soltana et al., 2015).

Some of the audit committee characteristics such as financial expertise and independence are vital for their effectiveness (e.g., Klein, 2002; Abbott et al., 2004; Krishnan, 2005). Nonetheless, gender diversity on the boards of directors and committees has also recently been considered as one of the factors which enhance their effectiveness (see, Chen et al., 2016; Lai et al., 2017; Aldamen et al., 2018). Female directors on the boards could both help improve the quality of decisions, provide the board of directors with a boost in their ability to monitor corporate disclosure and reports (Carter et al., 2010; Adams & Ferreira, 2009; Gul et al., 2011) and affect the degree of risk aversion and conservatism when making decisions and monitoring the management (Thiruvadi & Huang, 2011). Additionally, recent research has revealed that gender diversity can carry out functions for corporate governance and can be a potential factor in the activities and independence of the board of directors (e.g., Huse & Solberg, 2006; Huse et al., 2009; Adams & Ferreira, 2009; Abbott et al., 2012). This literature demonstrates that the presence of female directors on the board and its subgroups, such as the audit committee, is not only a matter of gender equality but is also a matter of corporate governance demanding sufficient consideration (Aldamen et al., 2018).

Soltana et al. (2015) argue that gender differences on the audit committee may ruin the activity of the small group, leading to the formation of a majority and minority in the group and a decline in the effectiveness of the audit committee. In contrast, gender diversity on audit committees composition and the presence of experienced members with different ideas can help the audit committee with a wide range of accounting issues, thereby leading to the reduction of fraud opportunity and financial misstatements (Gul et al., 2011). However, Chen et al. (2016) noted that some companies may appoint female directors with the intention of merely lessening criticism. They investigated the effects of board gender diversity on internal control weaknesses and provide evidence concerning the failure of critical mass theory. According to critical mass theory, female directors are not able to produce any changes unless their numbers reach a certain threshold (e.g., three female directors). In this study, we also attempt to provide evidence regarding the credibility of critical mass theory through investigating the relationship between gender diversity on the audit committee, one of the important subgroups of the board of directors (Kelin, 1998; Xie et al., 2003), and financial restatement.

Prior literature documents evidence of the relationship between the presence of female directors on the board and firm-specific variables such as firm value (Carter et al., 2003), return on equity (Ming & Eam, 2016), earnings quality (Srinidhi et al., 2011), earnings management (Arun et al., 2015), improvement of the informativeness of stock prices (Gul et al., 2011) and internal control weaknesses (Chen et al., 2016). In addition, the relationship has been confirmed between the presence of female directors on the audit committee with audit fees (Ittonen et al., 2010; Harjoto et al., 2015; Aldamen et al., 2018; Lai et al., 2017), auditor choice (Lai et al., 2017) and earnings quality (Thiruvadi & Huang, 2011).

Furthermore, the association between the presence of female directors on boards and corporate performance has been reviewed in prior studies. Some studies have suggested that gender diversity on the board of directors has a positive relationship with corporate performance (Luckerath, 2010; Campbell & Minguez-Vera, 2008), whereas other studies have found a negative relationship (Bohren & Strom, 2010; Adams & Ferreira, 2009) with some other research finding no relationship (Chapple & Humphrey, 2014; Carter et al., 2010). These mixed results leave the issue of improving organizational performance through gender diversity remaining unsolved, despite the huge extant literature. Nevertheless, female members appear interested in discussing difficult issues (Chen et al., 2016), are more conservative about financial issues (Francis et al., 2015) and play the oversight role successfully (Adams & Ferreira, 2009) and appear less tolerant towards opportunistic behavior (Thorne et al., 2003); it can be expected, therefore, that companies with female members on the board of directors and on its subgroups such as the audit committee increase financial reporting quality via reducing mistakes and restatements. Moreover, female members on audit committees appear to desire audit information of a higher quality (Aldamen et al., 2018) and this can reduce auditor failure to detect mistakes as one of the factors which increases restatements (Czerney et al., 2014).

In some countries, audit committees are either required by law (such as in Canada, Singapore and Thailand), mandated by regulators (such as Bangladesh, Malaysia and the U.S.), or are highly recommended by the code of best practice (e.g., Britain). In many countries, audit committees are not compulsory but companies can constitute audit

committees voluntarily. In Iran, the internal control instruction was approved in May 2012 and communicated in February 2013. Based on this instruction, companies listed on the Tehran Stock Exchange (TSE) are required to constitute audit committees (TSE, 2013). Therefore, considering the fact that audit committees are in their early stage of development in Iran and that the effectiveness of audit committee has a significant effect on minimizing agency conflicts, safeguarding shareholders' interests and maximizing the total value of firms (Zahra & Pearce, 1989; Dey, 2008), we investigated the effect of effective audit committee on financial statement restatements in Iranian firms through gender diversity characteristics (Ittonen et al., 2010; Thiruvadi & Huang, 2011; Harjoto et al., 2015; Aldamen et al., 2018). Prior research in Iran shows that the high percentage of Iranian companies restates their financial statements in order to correct accounting mistakes (e.g., Kordestani et al., 2011; Nickbakht & Rafiee, 2013). This can bring the reliability of the accounting information of such companies into doubt. Using the data on 683 firm-year observations in the TSE during the period 2013-2017, we found that the presence of at least one female director on audit committee reduces the likelihood of the incidence of financial restatements. Robustness tests also confirmed this result. Moreover, we found that independent and financial expert female directors on audit committee are more strongly associated with the reduction in financial restatements. Finally, our additional analysis suggests that, in firms with gender diversity on the audit committee and also the presence of independent and financial expert female directors, the likelihood of hiring auditors of a higher quality increases. Overall, our findings reveal that mandating the constitution of audit committees and subsequently the presence of female directors on these committees could reduce restatements and enhance the reliability of financial statements in Iran.

This study contributes to the accounting literature in several ways. First, this study contributes to the evolving literature on gender diversity and financial restatements. Prior research examined the relationship between audit committee characteristics (such as independence, size, expertise, and the frequency of audit committee meetings) and financial restatements (Abbott et al., 2004; Carcello et al., 2011; Lary & Taylor, 2012, Mohammad et al., 2018). Furthermore, Abbott et al. (2012) and Wahid (2018) studied the effect of board gender diversity on financial restatements. Nonetheless, the question of whether the presence of women on audit committee is associated with restatements remains unsolved. Whilst the ultimate responsibility for financial reporting rests with the board of directors, the routine responsibility and accountability for the financial reporting process within the firm increasingly devolves upon the audit committee which is widely believed to be the most important subgroup of the board (Xie et al., 2003). The audit committee is expected to serve a pivotal role in assuring the quality of financial reporting. For this reason, a huge number of previous studies on restatements and fraud have brought audit committees into focus of attention (either in place of or added to/along with the full board) (Abbott et al., 2012). Additionally, Adams and Ferreira (2009) found that female members on the board are more likely to join supervisory committees. Therefore, it seems that special focus on gender diversity on audit committees and its effect on financial reporting is of great importance.

Second, the importance of our study is beyond bridging the existing gap in the literature, as we witness the growing trend towards the presence of female members (Chen et al., 2016) and the tendency in global markets towards voluntary or mandatory recruitment of

female members on boards (Usman et al., 2018a). Some countries (e.g., Australia, Canada and Britain) recommended the participation of women on the board of directors and some other countries (e.g., Belgium, France, Netherlands, Italy, Norway and Spain) require the presence of women on the boards (Aldamen et al., 2018). Thus, reviewing and understanding how female directors participate on the board and its subgroups such as the audit committee is necessary for corporate governance improvement and can provide empirical evidence on the effectiveness of women in such groups for global markets. Specifically, the evidence of the present study may be of use to supervisors and policy makers in developing countries and send positive signals to them regarding the recommendation or requirement of gender diversity as a part of corporate governance mechanisms.

Third, in contrast to developed countries, the corporate governance structure in Iran is weak (Bagherpour et al., 2014). For instance, in countries like the U.S., all members of the audit committee must be independent, while there is no such requirement in Iran where there is a combination of female executives and independent female directors on audit committees. Therefore, this provides a unique opportunity to investigate whether independent female directors on audit committees play a prominent role in financial reporting. Furthermore, investigating the role of financial expert female directors on audit committees could be of interest. Our findings showed that the relationship between gender diversity on audit committees and financial restatements is stronger when female directors have independence and financial expertise. These findings contribute to the extant literature and provide new evidence on the more effective oversight and greater ability of independent female directors and financial experts respectively, compared to female executives and female directors who lack financial expertise. Previous studies have reviewed the role of female directors in corporate governance, but the suggestion that independent and financial expert female directors may perform their oversight function more effectively with greater ability has been disregarded (see, Adams & Ferreira, 2009; Gul et al., 2011; Aldamen et al., 2018). Finally, our findings are similar to those of Chen et al. (2016) and are inconsistent with critical mass theory, because we show that the presence of, at the very least, one female member on the audit committee reduces the likelihood of financial restatement and improves the financial reporting quality. This is highly important, owing to the fact that several studies such as Joecks et al. (2013) and Torchia et al. (2011) support critical mass theory in settings of firm performance and corporate innovation.

The rest of the paper is organized as follows: Section 2 provides a background to the Iranian context. Section 3 reviews the theoretical literature and Section 4 reviews the empirical literature and develops the research hypothesis. Section 5 presents the research design and consecutively the research model and definitions of the research variables. Section 6 presents the empirical results and discussion. The summary and conclusion are provided in Section 7.

2. Institutional background

Tehran Stock Exchange (TSE) is the largest capital market in Iran. TSE first opened in 1968 and is a member of Federation of Euro-Asian Stock Exchanges. Regarding TSE's legal structure, the regulations and requirements of financial reporting are comparable with those of Western countries such as the U.S. (Hesarzadeh, 2018) or some European countries,

especially in Eastern Europe (Mashayekhi & Bazaz, 2008). For example the TSE, implementing regulations of great importance such as for financial reporting (e.g., internal control reports, M&D reports, etc.) or for protecting investors (such as reports on suspicious transactions, irregularities and infractions, etc.), is enacting similar regulations to that of large capital markets such as in the U.S. (Hesarzadeh, 2018).

However, corporate governance in Iran is not yet well developed and Iranian companies have often met with criticism for their poor corporate governance mechanisms (Bagherpour et al., 2014; MohammadRezaei et al., 2018). In addition, prior research has demonstrated that there is a greater incidence of financial restatements in Iran when compared to developed countries such as the U.S. (e.g., Kordestani et al., 2011; Nickbakht & Rafiee, 2013). This raised concerns for regulators facing a reduction in both the credibility of financial reports and confidence of investors in the financial statements, pushing them into taking measures to mitigate such risks. The adoption of the internal controls instruction in 2012 was one of the important steps to improve the quality of financial reports. Based on this instruction, TSE firms were required to set up an audit committee and other specialized committees and to provide arrangements that interact with the committees and the internal audit unit to establish and implement appropriate and effective internal controls (Oradi et al., 2016a). According to the audit committee charter, the majority of the committee members should have independence and financial expertise, but companies were not required to maintain gender diversity on audit committees. However, recent studies in Iran reveal that approximately 11 percent of companies ensured the presence of at least one woman on their audit committees (Imani et al., 2017). Hence, these new Iranian regulations and corporate governance characteristics offer an opportunity to conduct research: the present study investigates how audit committee gender diversity leads to reductions in financial restatements. Particularly, this study has important implications for regulators in the Iranian capital market who are looking at ways of reducing harmful issues in financial reporting and improving their corporate governance. Recent research on the TSE revealed that the constitution of audit committees has been associated with an increase in the transparency of information (Fakhari & Rezaei, 2018) and the improvement of corporate performance (Oradi et al., 2016b). Particularly, Rezazadeh et al. (2017) suggest that audit committee characteristics (such as financial expertise and independence) are associated with a reduction in the restatement of financial statements. However, the research into gender diversity on audit committee is very limited in Iran.

3. Theoretical literature review

2.1. Audit committee and restatement

Restatement can be considered an important event which indicates poor quality financial reporting in previous periods [General Accounting Office (GAO), 2002]. Eilifsen and Messier (2000) consider four conditions for audited financial statements to be restated. Firstly, material misstatements by a company's due to some inherent risks (e.g., aggressive accounting practices of the management, misapplication of accounting principles and approaches, etc.). Secondly, misstatements are not detected and prevented by the internal controls. Thirdly, the external auditor fails to detect the misstatements and the financial statements are issued. Fourthly, the misstatements are detected after a while and, if they are

significant, companies will be required to correct, restate and reissue financial statements. The urgent need for restatement arises when the first three conditions mentioned above are observed in the financial reporting process (Abbott et al., 2004). According to previous literature, restatements lead to the reduction of corporate value (Palmrose & Scholz, 2004), a negative response on the stock price (Wilson, 2008; Chen et al., 2014), an increase in CEO/CFO turnover (Hennes et al., 2008) and litigation risk (Palmrose et al., 2004; Demirkan & Fuerman, 2014). Furthermore, restatements can reflect on earnings management (Agrawal & Chandha, 2005). Thus, considering the consequences of restatement, it is necessary to identify the factors that could reduce financial restatements.

Prior literature demonstrates that companies with strong corporate governance are more engaged in monitoring the financial reporting process (Abdollah et al., 2010) and companies who issue financial restatements suffer from a weak governance structure (Efendi et al., 2007). The board of directors and its subgroups such as the audit committee are the main governance mechanisms which play a major oversight role on behalf of shareholders. The significance of audit committee has been highlighted by corporate governance laws and regulations. For instance, according to Section 301 of the Sarbanes-Oxley (SOX) Act (2002), public companies are required to constitute audit committees. This law attempts to improve the quality of the financial reporting process (Carver, 2013). From the perspective of agency theory, audit committees fulfill a significant role in reducing agency problems (Zahra & Pearce, 1989; Dey, 2008) and can lead to an improvement in financial reporting quality (Krishnan et al., 2011). In addition, an effective audit committee improves the quality of internal controls over financial reporting (Krishnan, 2005; Zhang et al., 2007) and enhances the value of the accounting information (Habib & Azim, 2008). Moreover, McMullen and Raghunandan (1996) also suggest that companies with effective audit committees are less likely to face mistakes, irregularities, and fraudulent financial reporting.

2.2. Gender diversity

Gender theory holds that women have a significant part to play in economic success (Waring, 1988). Moreover, there are gender-based ethical differences. To illustrate these differences, the gender socialization theory of Dawson (1997) could be of great help. According to this theory, women exposed to different ethical developments, tend to hold different values leading to various outlooks and behavior. For instance, men may attach value to money, progress and power and be more willing to enter competitive situations, whereas women might pay more attention to social interactions, fulfill their assigned tasks more effectively, be more likely to comply with the regulations (Geiger & Connell, 1999) and this may lead to the improvement of information (Carter et al., 2010). In addition, research on the field of group work points to the fact that gender diverse groups perform differently from same-gender groups, due to the various experiences and beliefs gender diverse groups have. What is more, social diversity (gender, age and ethnic groups) may reduce intergroup communication, increase conflict of opinions and disagreements and consequently lead to the enhancement of the effectiveness of group decision-making (Ittonen et al., 2010).

Furthermore, prior research on gender diversity points to behavioral differences between males and females. For example, females may possess greater communication skills (Westphal & Milton, 2000) and tend to ask the questions which men do not ask (Konrad et

al., 2008). They may improve the decision making and the leadership style (Rosener, 1990) and pay more attention to qualitative issues such as social responsibility, humanitarianism (Hafsi & Turgut, 2013), task orientation and compliance with rules and regulations (Geiger & Connell, 1999). Women as compared to men may be more risk-averse (Beckmann & Menkhoff, 2008; Bellucci et al, 2010; Thiruvadi & Huang, 2011, Francis et al., 2015), make more conservative decisions (Schubert, 2006) and be less tolerant towards opportunistic behaviour (Krishnan & Parsons, 2008). Furthermore, women may be less over-confident than men (Huang & Kisgen, 2013). Wood et al. (1985) state that women who work in a group can put forward better solutions to a problem. They found that men come up with more solutions for a specific problem, but the solutions of a higher quality were often offered by women.

However, there are some concerns that firms may add female members to merely reduce criticism: female directors are only tokens (critical mass theory) (Chen et al., 2016). Prior research has removed this concern to a large extent and indicated that the presence of at least one female director on the board and on its subgroups such as the compensation committee and audit committee leads to improvement of corporate performance (e.g., Chen et al., 2016; Thiruvadi & Huang, 2011; Usman et al., 2018a). In this study, we extend this research stream and explore how women on audit committees can impact financial restatements.

4. Empirical literature review and hypothesis development

Consistent with gender theory, prior literature suggests that women can play a major role in enhancing oversight, board performance and corporate output. Adams and Ferreira (2009) present evidence which points to the fact that women perform better in the monitoring role in top management. Bart & McQueen (2013) suggest that women make better directors because they are more likely to take account of the interests of all stakeholders. The increase in the number of female directors on boards benefits the companies, shareholders and customers (Grosvold et al., 2007). Davis (2011) found that the presence of one female director on the board reduces the likelihood of bankruptcy by up to 20 percent and the presence of two or three of them could reduce it even more. Sial et al. (2018) concluded that gender diversity on the board results in the improvement of corporate performance. Also, they showed that corporate social responsibility modifies the relationship between gender diversity on the board and corporate performance. Moreover, Usman et al. (2018b) showed that female directors on the board are associated with the development of the CEO's power. Usman et al. (2018c) found that female CEOs lead to the reduction in cost of debt.

Furthermore, prior research provides evidence on the improvement of financial reporting quality as a result of the presence of female directors on the board. For instance; gender diversity on the board of directors is associated with the improvement of accruals quality (Srinidhi et al., 2011), the accuracy of financial analysts' earnings forecasts (Gul et al., 2013) and the quality of internal controls over financial reporting (Chen et al., 2016). Moreover, Barua et al. (2010) reported that companies with female CFOs have earnings of a greater quality and such companies are substantially associated with an improvement of accounting conservatism in the financial reporting (Francis et al., 2015).

Abbott et al. (2012) and Wahid (2018) argue that gender diversity on the board of directors could result in the board making decisions of a higher quality through an increase in

interactions and consideration of different points of the view. They found that gender diversity on the board of directors reduces the likelihood of the incidence of financial statements restatement. However, empirical evidence about the effect of audit committee gender diversity on financial restatements is sparse. Prior studies have focused on the role of other characteristics of audit committees on financial restatement. Using data from U.S. companies; [Abbott et al \(2004\)](#) and [Carcello et al \(2011\)](#) showed that there is a negative relationship between independence, frequency of meetings and financial expertise on audit committees and financial restatement. Using data from Australian companies; [Lary and Taylor \(2012\)](#) revealed that audit committee independence reduces the incidence and intensity of financial restatements. Further, [Mohammad et al. \(2018\)](#) based on a sample of Malaysian companies; found that there is a negative relationship between independence, frequency of meetings, financial expertise, and the size of audit committees and financial restatements.

Despite the significant role of the audit committee and the necessity for an increase in diversity in audit committee composition, the research conducted in this context is relatively limited. [Thiruadi and Huang \(2011\)](#) stated that the presence of female directors on audit committees improves the quality of operating the audit committee in terms of external performance, and reduces earnings management. [Ittonen et al. \(2010\)](#) and [Harjoto et al. \(2015\)](#) suggest that audit committees with female members are associated with lower audit fees. These authors state that female directors may lower audit fees by affecting auditor assessment of audit risk (by improving communication with auditors or by improving internal oversight effectiveness and increasing the accuracy of the financial reporting process). On the contrary, [Aldamen et al. \(2018\)](#) and [Lai et al. \(2017\)](#) reported that gender diversity on the audit committee leads to an increase in audit fees. They argue that women, owing to a higher level of conscience, seriousness and responsibility, seek for audits of a higher quality. Higher audit quality is associated with detecting material mistakes, thereby reducing restatements ([Jiang et al., 2015](#)).

Given gender theory, the literature discussed above and female characteristics such as task orientation, better monitoring ability, risk aversion and conservatism, and in line with the idea of an association between the reduction of restatements and the presence of women on the board of directors ([Abbott et al, 2012](#), [Wahid, 2018](#)), we assume that the presence of female directors on audit committees strengthens the external governance of the firm and its auditor, reduces opportunistic behaviour of the management and mistakes and consequently reduces restatements. Therefore, the research hypothesis is as follows:

H1 : There is a negative association between the presence of female director on the audit committee and the incidence of restatement.

5. Research design

5.1. Sample and data

The research sample comprises all the companies listed on the TSE in the period 2013-2017. The reason for choosing 2013 as the base year is the communication of the internal controls manual requiring the companies listed on the TSE to constitute an audit committee in the year 2013 ([TSE, 2013](#)).

Table 1, Sample selection

	Observations
Initial observations for the period 2013 to 2017 (5 (year) × 325 (firms) = 1,625	1,625
Less: financial or utility industry firms (5 (year) × 138 (firms) = 690	690
Less: delisted firms	51
Less: number of firm-year with missing observations such audit committee characteristics data:	201
Number of observations in final analysis	683

The data is collected from the annual reports of the companies listed on the Tehran Stock Exchange [1] and the Rahavard-e-Novin database [2]. The initial sample includes 1625 firm-year observations. The final sample decreases to 683 firm-year observations when financial firms and utilities are excluded due to the different nature of the operations of such firms (see, [Hesarzadeh & Bazrafshan, 2018](#)). Moreover, we excluded the delisted firms and observations with insufficient information for measuring the variables. [Table 1](#) outlines the sample selection procedure. All variables are winsorized at the 1st and 99th percentiles to reduce the influence of outliers on the regression results.

5.2. Regression model

We estimate the following logistic regression model for investigating the relationship between the presence of females on audit committees and the incidence of restatements:

$$\begin{aligned}
 Restate_{it} = & \beta_0 + \beta_1 Ac_fd_{it} + \beta_2 Ac_indp_{it} + \beta_3 Ac_exp_{it} + \beta_4 Ac_size_{it} \\
 & + \beta_5 Board_size_{it} + \beta_6 Board_indp_{it} + \beta_7 CEOchair_{it} + \beta_8 Conown_{it} \\
 & + \beta_9 Instown_{it} + \beta_{10} Stown_{it} + \beta_{11} Mgrown_{it} + \beta_{12} Age_{it} \\
 & + \beta_{13} Zscore_{it} + \beta_{14} Leverage_{it} + \beta_{15} Finance_{it} + \beta_{16} Growth_{it} \\
 & + \beta_{17} ROA_{it} + \beta_{18} Size_{it} + \beta_{19} Accrual_{it} + \beta_{20} Weak_{it} + \beta_{21} Big_{it} \\
 & + \beta_{22} Spec_{it} + Industry Dummies + Year Dummies + \varepsilon_{it}
 \end{aligned} \tag{1}$$

Where, the dependent variable is restatement (*Restate*), which equals 1 if the financial statements of the firm are restated in the year t, otherwise 0. Our independent variable is gender diversity (*Ac_fd*), which equals 1 if there is at least one female director on the audit committee, otherwise 0 ([Ittonen et al., 2010](#); [Aldamen et al., 2018](#)). In line with prior research, we controlled for the variables related to the effectiveness of audit committee which are associated with the incidence of restatement ([Abbott et al., 2004](#); [Carcello et al., 2011](#); [Lary & Taylor, 2012](#)). These variables include audit committee independence (*Ac_indp*), financial expertise (*Ac_exp*) and size (*Ac_size*) [3].

Furthermore, in accordance with prior research ([Basely, 1996](#); [Abbott et al., 2004](#)), we controlled for the characteristics of the board of directors including size (*Board_size*), independence (*Board_indp*) and CEO duality (*CEOchair*) which could affect the incidence of restatement. Decentralized ownership can increase the likelihood of restatements ([Defond & Jambalyo, 1991](#); [GAO, 2002](#)). In addition, previous studies demonstrate that there is a positive relationship between institutional ownership ([Wahid, 2018](#)) and state ownership ([Wang & Wu, 2011](#)) and restatements. Further, [Jiang et al \(2015\)](#) show a negative relation

between managerial ownership and restatements. Accordingly, we included the concentration of ownership (*Conown*), institutional ownership (*Instown*), state ownership (*Stown*) and managerial ownership (*Mgrown*) variables in the equation. Furthermore, firm age is associated with reporting problems; presumably as the firm age increases, the likelihood of restatement decreases, owing to the fact that young firms face problems which may lead to more restatements (Basely, 1996). Financial distress also increases the likelihood of opportunistic reporting by management and this leads to restatement (Jiang et al., 2015). Hence, firm age (*Age*) and financial distress (*Zscore*) are included in the equation. In the following, we include some firm-level financial variables as the determining factors in restatement in the equation (see, Abbott et al., 2004, Almer et al., 2008; Carcello et al., 2011; Abbott et al., 2012; Jiang et al., 2015; Zhang et al., 2018). These variables include *Leverage*, *Finance*, *Growth*, *ROA*, *Size*, *Accrual*. Plumlee and Yohn (2010) consider internal controls weakness as one of the determining factors in restatements. Thus, we controlled for internal controls weakness (*Weak*) in the equation. Furthermore, prior studies argue that, with the enhancement of audit quality and auditor's knowledge of the client's activity, the likelihood of restatement decreases (Chin & Chi, 2009; Jiang et al., 2015). Therefore, we controlled for auditor size (*Big*) [4] and auditor industry speciality (*Spec*) variables as they are proxies for audit quality (DeAngelo, 1981; Dunn & Mayhew, 2004). We also include industry and year dummy variables in all our regression specification. All the variables are defined in Table 2.

Table 2, Descriptions of variables

Variable	Description
Dependent variable	
<i>Restate</i>	An indicator variable with the value of 1 for firm-year observations with restatement and 0 otherwise
Independent variable	
<i>Ac_fd</i>	An indicator variable with the value of 1 if there is at least one female director on the audit committee, and 0 otherwise
Control variables	
<i>Ac_indp</i>	the proportion of independent female directors on the audit committee
<i>Ac_exp</i>	The proportion of audit committee members with financial expertise
<i>Ac_size</i>	The number of audit committee members
<i>Board_size</i>	The number of board members
<i>Board_indp</i>	The proportion of independent directors on the board
<i>CEOchair</i>	An indicator variable with the value of 1 if the CEO and chairman are the same and 0 otherwise.
<i>Conown</i>	The proportion of a firm's outstanding shares that are owned by the largest shareholder (=>%5)
<i>Instown</i>	The proportion of shares held by institutional investors
<i>Stown</i>	An indicator variable which equals 1 if the government is the largest shareholder (=>%50)
<i>Mgrown</i>	The cumulative managerial share ownership
<i>Age</i>	The natural logarithm of number of years the firm has been established
<i>Zscore</i>	Altman Z Score to predict bankruptcy using the coefficients from the original Altman formula. The higher the Z score is, the lower the chance of bankruptcy
<i>Leverage</i>	Total debt divided by total assets
<i>Finance</i>	Operating cash flows minus average capital expenditures ($_{it-3}$ to $_{it-1}$), divided by lagged current assets
<i>Growth</i>	The proportion of change in annual sales revenue
<i>ROA</i>	Net income divided by total assets.

<i>Size</i>	The natural logarithm of total assets
<i>Accrual</i>	Total accruals to sales, which is calculated as net income minus operating cash flows, divided by lagged assets
<i>Weak</i>	An indicator variable with the value of 1 if the auditor reports an internal control weakness for the ICFR audit of fiscal year t, 0 otherwise
<i>Big</i>	An indicator variable with the value 1 if the auditor is a Big audit firm, and zero otherwise
<i>Spec</i>	An indicator variable with the value of 1 if the client's audit firm audits at least 20 percent of sales in the client's industry, and 0 otherwise (Casterella et al., 2004)
Additional variables	
<i>Ac_fp</i>	The proportion of female directors on the audit committee
<i>Ac_fbi</i>	The Blau index, which is measured as $1 - \sum_{i=1}^n P_i^2$, where P_i is the proportion of each category and n is the number of categories. In our case, n is 2 and the categories are "male" and "female"
<i>Ac_fsi</i>	The Shannon index, which is measured as $-\sum_{i=1}^n P_i \ln P_i$, where P_i is the proportion of each category and n is the number of categories. In our case, n is 2 and the categories are "male" and "female"
<i>Ac_findp</i>	An indicator variable with the value of 1 if there is at least one independent female director on the audit committee, and 0 otherwise
<i>Ac_fexp</i>	An indicator variable with the value of 1 if there is at least one financial expert female on the audit committee, and 0 otherwise
<i>Board_fp</i>	The proportion of female directors on the board
<i>Chta</i>	The proportion of change in total assets from the previous year
<i>Aturn</i>	Asset turnover ratio, measured as sales divided by total assets
<i>Curr</i>	Current assets divided by total assets
<i>Quick</i>	Current assets minus inventory divided by current liabilities
<i>Loss</i>	An indicator that equals 1 when firm net income is negative, 0 otherwise

Note: This table defines the main variables. Furthermore, the table includes the definitions of additional variables, which is used for robustness tests and additional analyses at the end of the findings section.

6. Empirical results and discussion

6.1. Descriptive statistics and correlations

Table 3 provides descriptive statistics of variables for the complete sample (panel A) and firm-year observations in two groups with restatement and without restatement and differences in means (Panel B). Panel A of the Table 3 results show that 66.47 percent of the final sample including 683 firm-year observations, used in the final analysis, restated their financial statements. The percentage has considerably decreased in comparison with the research conducted on the TSE (Nikbakht & Rafeei, 2012) showing that approximately 79 percent of the companies on the TSE restated their financial statements. In addition, this finding is notably higher than the mean of restatements in developed countries (e.g., Chen et al., 2016). The findings in panel A also show that the percentage of the presence of at least one female member on audit committees (*Ac_fd*) of the sample firms is 12 which is close to the mean of the presence of at least one female member on audit committees in Australia (15 percent) (Aldamen et al., 2018).

Furthermore, Panel B of Table 3 indicates that the mean of the *Ac_fd* in firms without restatements is significantly higher than that of firms with restatements. Moreover, Panel B demonstrates that, compared to the firms without restatements, firms with restatements have a higher CEO duality (*CEOchair*), state ownership (*Stown*), firm age (*Age*), growth of sales (*Growth*), firm size (*Size*) and internal control weaknesses (*Weak*). In contrast, firms without restatement, in comparison with firms with restatement, have a higher audit committee

independence (*Ac_indp*), board of directors' independence (*Board_indp*), managerial ownership (*Mgrown*) and industry specialist auditor selection (*Spec*).

Table 4 reports Spearman's correlations between the variables used in the main analysis. Bold denotes significant correlation coefficients at the 10 percent level. The correlation between *Restate* and *Ac_fd* is negative (-0.18) and statistically significant, indicating that audit committee gender diversity may be associated with financial restatement. The correlations between the other variables never exceed 50 percent, thus alleviating the concerns of the potential of multicollinearity affecting the results. To further check for the possibility of multicollinearity between the variables included in our model, we additionally calculated the variance inflation factors (VIF) for the independent variables. The VIF scores in all models (when estimated regressions) is below the acceptable threshold of 5, suggesting that multicollinearity is not a significant issue.

Table 3, Descriptive Statistics

Panel A: Descriptive Statistics for the Full Sample (n=683)						
<i>Descriptive statistics for continuous variables:</i>						
<u>Variable</u>	<u>Mean</u>	<u>SD</u>	<u>Min</u>	<u>Q1</u>	<u>Q3</u>	<u>Max</u>
<i>Ac_indp</i>	0.727	0.136	0.33	0.67	0.67	1.00
<i>Ac_exp</i>	0.866	0.186	0.33	0.67	1.00	1.00
<i>Ac_size</i>	3.149	0.520	3.00	3.00	3.00	5.00
<i>Board_size</i>	5.112	0.391	5.00	5.00	5.00	7.00
<i>Board_indp</i>	0.635	0.131	0.20	0.60	0.80	0.86
<i>Conown</i>	0.813	0.140	0.36	0.73	0.92	0.99
<i>Instown</i>	0.432	0.283	0.00	0.18	0.66	0.95
<i>Mgrown</i>	0.207	0.288	0.00	0.00	0.51	0.91
<i>Age</i>	3.548	0.398	2.64	3.26	3.91	4.14
<i>Zscore</i>	2.251	1.647	-0.89	1.20	2.96	9.22
<i>Leverage</i>	0.558	0.208	0.07	0.42	0.71	1.05
<i>Finance</i>	0.352	0.392	-0.34	0.11	0.49	2.08
<i>Growth</i>	0.429	1.644	-0.94	-0.06	0.38	11.55
<i>ROA</i>	0.134	0.150	-0.23	0.03	0.21	0.74
<i>Size (Ln assets)</i>	14.347	1.425	11.05	13.47	14.94	18.38
<i>Accrual</i>	0.010	0.147	-0.47	-0.07	0.09	0.54
<i>Descriptive statistics for dummy variables:</i>						
<u>Variable</u>	<u>Min</u>	<u>Max</u>	<u>frequency</u>	<u>1</u>	<u>(%)</u>	
<i>Restate</i>	0	1	454		66.47	
<i>Ac_fd</i>	0	1	86		12.59	
<i>CEOchair</i>	0	1	141		20.64	
<i>Stown</i>	0	1	100		14.64	
<i>Weak</i>	0	1	213		31.18	
<i>Big</i>	0	1	159		23.25	
<i>Spec</i>	0	1	238		34.85	

Panel B: Descriptive Statistics by Restate						
	Restate =1 (Observations =454)		Restate = 0 (Observations =229)		Differences in Means	p-value
	<u>Mean</u>	<u>Std. Dev.</u>	<u>Mean</u>	<u>Std. Dev.</u>		
<i>Ac_fd</i>	0.081	0.273	0.213	0.411	-0.132	0.000***
<i>Ac_indp</i>	0.713	0.124	0.753	0.154	-0.040	0.000***
<i>Ac_exp</i>	0.858	0.189	0.883	0.178	-0.025	0.103
<i>Ac_size</i>	3.129	0.486	3.187	0.580	-0.058	0.170
<i>Board_size</i>	5.121	0.394	5.096	0.385	0.025	0.429
<i>Board_indp</i>	0.629	0.137	0.648	0.117	-0.019	0.076*
<i>CEOchair</i>	0.231	0.422	0.157	0.364	0.074	0.023**
<i>Conown</i>	0.810	0.144	0.817	0.131	-0.007	0.571

<i>Instown</i>	0.424	0.285	0.448	0.279	-0.024	0.292
<i>Stown</i>	0.162	0.369	0.113	0.317	0.049	0.084*
<i>Mgrown</i>	0.193	0.277	0.234	0.308	-0.041	0.080*
<i>Age</i>	3.579	0.410	3.487	0.366	0.092	0.004***
<i>Zscore</i>	2.260	1.766	2.232	1.385	0.028	0.834
<i>Leverage</i>	0.564	0.211	0.545	0.202	0.019	0.254
<i>Finance</i>	0.352	0.406	0.354	0.365	0.002	0.942
<i>Growth</i>	0.534	1.907	0.222	0.893	0.312	0.019**
<i>ROA</i>	0.130	0.150	0.141	0.152	0.011	0.396
<i>Size (Ln assets)</i>	14.431	1.444	14.181	1.372	0.250	0.029**
<i>Accrual</i>	0.011	0.143	0.007	0.153	0.004	0.714
<i>Weak</i>	0.350	0.477	0.235	0.425	0.115	0.002***
<i>Big</i>	0.236	0.424	0.227	0.419	0.009	0.801
<i>Spec</i>	0.319	0.466	0.406	0.492	-0.087	0.024**

Note: This table presents the descriptive statistics for the variables used in the main analysis.

*, **, *** Significant at 10, 5 and 1 percent levels, respectively. See [Table 2](#) for variable definitions.

Table 4, Spearman rank correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	1.00												
(2)	-0.18	1.00											
(3)	-0.15	0.11	1.00										
(4)	-0.06	0.06	-0.10	1.00									
(5)	-0.04	0.08	0.05	-0.13	1.00								
(6)	0.05	0.09	0.05	-0.01	0.10	1.00							
(7)	-0.05	0.07	-0.07	0.21	-0.02	0.25	1.00						
(8)	0.08	-0.05	-0.06	-0.00	0.06	-0.10	-0.10	1.00					
(9)	-0.00	-0.13	0.02	-0.03	0.06	0.07	0.07	-0.05	1.00				
(10)	-0.04	0.02	0.03	-0.15	0.09	0.01	-0.03	0.03	0.23	1.00			
(11)	0.06	-0.15	0.02	-0.07	0.00	-0.02	-0.17	-0.07	-0.11	-0.13	1.00		
(12)	-0.03	0.00	-0.05	0.02	-0.02	-0.19	-0.04	0.11	0.18	-0.02	-0.17	1.00	
(13)	0.12	-0.10	0.04	0.04	-0.05	-0.01	-0.09	-0.01	-0.21	-0.11	0.18	-0.05	1.00
(14)	-0.03	0.08	0.00	0.02	0.05	0.04	0.03	-0.01	0.10	0.07	-0.04	0.01	-0.05
(15)	0.04	-0.10	0.00	-0.08	-0.10	-0.16	-0.15	0.06	-0.04	-0.14	0.12	0.12	-0.03
(16)	-0.03	0.03	0.00	0.13	0.06	0.10	0.19	-0.15	0.19	0.03	-0.03	0.01	-0.02
(17)	0.04	0.06	0.06	-0.00	-0.01	0.02	0.02	-0.01	0.03	0.00	-0.05	0.01	-0.05
(18)	-0.02	0.08	0.07	0.08	0.08	0.11	0.16	-0.02	0.18	0.13	-0.11	0.06	0.01
(19)	0.09	-0.09	0.04	0.02	0.12	0.20	0.09	0.01	0.04	-0.01	0.22	-0.04	0.00
(20)	0.03	0.07	0.07	0.00	0.00	0.03	0.01	0.05	0.00	0.07	-0.05	0.02	0.02
(21)	0.11	-0.05	-0.13	0.01	0.00	-0.01	-0.03	0.02	-0.01	0.01	-0.01	0.00	-0.01
(22)	0.00	-0.11	0.09	-0.04	-0.06	0.02	0.03	0.02	0.03	0.03	0.19	0.09	0.21
(23)	-0.08	0.03	0.01	0.04	-0.01	0.10	0.05	-0.00	0.07	-0.08	0.22	0.02	0.08
	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)			
(14)	1.00												
(15)	-0.35	1.00											
(16)	0.26	-0.22	1.00										
(17)	-0.49	-0.06	0.11	1.00									
(18)	0.75	-0.53	0.42	0.38	1.00								
(19)	-0.09	0.05	0.14	-0.03	0.04	1.00							
(20)	0.45	-0.33	-0.34	0.30	0.56	-0.00	1.00						
(21)	-0.04	-0.02	-0.05	-0.11	-0.05	-0.00	-0.03	1.00					
(22)	-0.01	0.04	-0.01	-0.02	0.02	0.23	0.05	-0.07	1.00				
(23)	0.11	-0.00	0.06	-0.02	0.12	0.17	0.04	-0.02	0.54	1.00			

Notes: 1, Restate, 2, Ac_fd, 3, Ac_indp, 4, Ac_exp, 5, Ac_size, 6, Board_size, 7, Board_indp, 8, CEOchair, 9, Conown, 10, Instown, 11, Stown, 12, Mgrown, 13, Age, 14, Zscore, 15, Leverage, 16, Finance, 17, Growth, 18, ROA, 19, Size, 20, Accrual, 21, Weak, 22, Big, 23, Spce. Coefficients in bold are significant at 0.10 levels. See [Table 2](#) for variable definitions.

6.2. Regression results

[Table 5](#) indicates the details of the relationship between audit committee gender diversity and the incidence of restatement. Evidence reveals that audit committee gender diversity impacts the likelihood of restating the financial statements. In particular, the coefficient of audit committee gender diversity (*Ac_fd*) is (-0.730) and *Z-Stat* is equal -2.61 with a significance level of 0.01, which shows that the presence of at least one female director on the audit committee has a negative relationship with restatements and thus the research hypothesis is supported. This finding is consistent with prior research on board gender diversity and restatement ([Abbott et al. 2012](#); [Wahid, 2018](#)) and supports gender theory, because gender diversity is a factor of organizational success and information improvement ([Carter et al., 2010](#)). A reason for this implication can be that female directors are more risk averse (e.g., [Francis et al., 2015](#)), do not tolerate opportunistic behavior ([Krishnan & Parsons, 2008](#)) and are inclined to reports of a high quality ([Thiruvadi & Huang, 2011](#)).

Table 5, Main regression results and alternative measures of audit committee gender diversity

<i>Variable</i>	<i>Coefficient</i>	<i>Z-Stat</i>	<i>Coefficient</i>	<i>Z-Stat</i>	<i>Coefficient</i>	<i>Z-Stat</i>	<i>Coefficient</i>	<i>Z-Stat</i>
<i>Ac_fd</i>	-0.730***	-2.61						
<i>Ac_fp</i>			-2.169**	-2.46				
<i>Ac_fbi</i>					-1.643**	-2.51		
<i>Ac_fsi</i>							-1.152**	-2.54
<i>Ac_indp</i>	-0.783***	-2.66	-1.899***	-2.70	-1.891***	-2.69	-1.886***	-2.68
<i>Ac_exp</i>	-0.907	-1.62	-0.906	-1.62	-0.907	-1.62	-0.906	-1.62
<i>Ac_size</i>	-0.467**	-2.35	-0.463**	-2.50	-0.455**	-2.46	-0.450**	-2.43
<i>Board_size</i>	0.355	1.30	0.355	1.30	0.355	1.30	0.355	1.30
<i>Board_indp</i>	-1.057	-1.39	-1.035	-1.56	-1.042	-1.37	-1.046	-1.37
<i>CEOchair</i>	0.601**	2.44	0.597**	2.42	0.598**	2.43	0.598**	2.43
<i>Conown</i>	-0.195	-0.25	-0.165	-0.21	-0.176	-0.23	-0.181	-0.23
<i>Instown</i>	-0.282	-0.81	-0.285	-0.82	-0.284	-0.81	-0.283	-0.81
<i>Stown</i>	-0.360	-1.05	-0.352	-1.03	-0.355	-1.04	-0.356	-1.04
<i>Mgrown</i>	-0.299	-0.84	-0.298	-0.83	-0.299	-0.83	-0.299	-0.83
<i>Age</i>	0.899***	3.50	0.900***	3.51	0.899***	3.51	0.899***	3.50
<i>Zscore</i>	0.020	0.19	0.023	0.22	0.022	0.21	0.022	0.20
<i>Leverage</i>	0.211	0.37	0.209	0.36	0.210	0.36	0.210	0.37
<i>Finance</i>	0.496	1.13	0.490	1.12	0.492	1.12	0.493	1.12
<i>Growth</i>	0.159*	1.66	0.159*	1.66	0.159*	1.66	0.159*	1.66
<i>ROA</i>	-0.898	-0.61	-0.930	-0.63	-0.919	-0.62	-0.914	-0.62
<i>Size</i>	0.275***	2.98	0.274***	2.97	0.274***	2.97	0.275***	2.97
<i>Accrual</i>	1.500	1.25	1.490	1.25	1.495	1.25	1.496	1.25
<i>Weak</i>	0.511**	2.44	0.504**	2.41	0.506**	2.42	0.507**	2.43
<i>Big</i>	0.076	0.27	0.080	0.29	0.078	0.28	0.078	0.28
<i>Spec</i>	-0.548**	-2.27	-0.555**	-2.30	-0.552**	-2.29	-0.551**	-2.28
Constant	-2.817	-1.28	-2.753	-1.25	-2.768	-1.26	-2.780	-1.26
IndustryDum		Yes		Yes		Yes		Yes

YearDum	Yes	Yes	Yes	Yes
LR (<i>prob</i>)	118.31*** (0.000)	117.55*** (0.000)	117.81*** (0.000)	117.94*** (0.000)
Pseudo R^2	0.1358	0.1349	0.1352	0.1354
N	683	683	683	683

*, **, ***Significant at 10, 5 and 1 percent levels, respectively. See [Table 2](#) for variable definitions.

In the following, the evidence demonstrates that there is a significant negative relationship between audit committee independence (*Ac_indp*) and audit committee size (*Ac_size*) with restatement. These results are consistent with prior research ([Abbott et al., 2004](#); [Carcello et al., 2011](#); [Lary & Taylor, 2012](#)) and show that, with an increase in audit committee effectiveness, the likelihood of incorrect reporting decreases. Additionally, the evidence consistent with [Abbott et al. \(2012\)](#) demonstrates a significant positive relationship between CEO duality (*CEOchair*) and restatement which points to the fact that companies with weak corporate governance are more likely to restate their financial statements. Moreover, the findings also reveal that firm characteristics including firm age (*Age*), sales growth (*Growth*) and firm size (*Size*) are significantly associated with restatement. Furthermore, consistent with prior research, internal controls weakness (*Weak*) has a significant positive relationship with restatement ([Plumlee & Yohn, 2010](#)) and the audit quality measured by hiring an industry specialist auditor (*Spec*) reduces restatement ([Chin & Chi, 2009](#)).

6.3. Robustness tests

6.3.1. Alternative measures of audit committee gender diversity

To ensure the further robustness of our findings, we used three alternative measures of gender diversity on audit committees (see, [Sial et al., 2018](#); [Usman et al., 2018a](#)), including: *Ac_fp*, *Ac_fbi*, and *Ac_fsi*. *Ac_fp* is the proportion of female directors on the audit committee, while *Ac_fbi* and *Ac_fsi* are two comprehensive measures of gender diversity on the audit committee measured using formulas from the Blau index ([Blau, 1977](#)) and the Shannon index ([Shannon, 1948](#)), respectively (see [Table 2](#)). [Table 5](#) shows that the gender-diversity measures (*Ac_fp*, *Ac_fbi*, and *Ac_fsi*) remain significant and negative. These results are consistent with our main findings.

6.3.2. Problem of Endogeneity

Recently, research on boardroom gender diversity or board sub-committees gender diversity (i.e., on the compensation or audit committees) are more concerned about the endogeneity issues. For example, previous studies ([Green & Homroy, 2018](#); [Wahid, 2018](#), [Usman et al., 2018a](#); [2018b](#); [Sial et al., 2018](#)) noted that gender diversity can be an endogenous variable. Therefore, we use three procedures for mitigating endogeneity concerns. First, following the works of [Usman et al \(2018a, 2018b\)](#) and [Sial et al. \(2018\)](#), we use the one-year lagged audit committee gender diversity proxy because female directors need some time to affect firm performance. In Method-1 of [Table 6](#), the coefficient of *Ac_fd* was significant and negative. These results are similar to our previous findings that gender-diverse audit committees reduce the likelihood of financial restatements.

Second, we used instrumental variables and estimated our main regression via the probit model with endogenous. In line with Bruynseels and Cardinaels (2014), Usman et al (2018a, 2018b) and Sial et al. (2018), we used the two instrumental variables for gender diversity—i.e., lagged values and the industry average of audit committees’ gender-diversity measures—that are most likely to meet the exclusion restriction (i.e., correlated with the decision to have female directors on the audit committee but not correlated with financial restatement). Method-2 of Table 6 shows that the coefficients of *Ac_fd* remain negative and significant. These results validate our main findings.

Third, we used the propensity-score-matching method (PSM) because firms with and without a gender-diverse audit committee may vary in characteristics and it may be the case that the incidence of financial restatements are due to these characteristics rather than due to audit committee gender diversity. In line with previous studies (see, Bugeja et al., 2016; Usman et al., 2018), PSM is based on the probability that a firm has at least one female director on its audit committee (*Ac_fd*) based on the firm size (*Size*), board size (*Board_size*), the proportion of female directors on the board (*Board_fp*), the proportion of independent directors on the board (*Board_indp*) and institutional ownership (*Instown*) [5]. Method-3 of Table 6 shows that the results based on PSM are consistent with our main findings in Table 5 [6]. Overall, the results show that our main findings have not been affected by endogeneity.

Table 6, Endogeneity test

<i>Method</i>	(1)		(2)		(3)	
	Lag of gender diversity		Instrumental variables		Propensity score matching	
<i>Variable</i>	<i>Coefficient</i>	<i>Z-Stat</i>	<i>Coefficient</i>	<i>Z-Stat</i>	<i>Coefficient</i>	<i>Z-Stat</i>
<i>Ac_fd</i>	-0.719**	-2.31	-0.667**	-2.38	-5.851***	-3.40
<i>Ac_indp</i>	-1.881**	-2.41	-0.938**	-2.03	-4.537	-1.22
<i>Ac_exp</i>	-0.800	-1.26	-0.408	-1.11	2.992	0.79
<i>Ac_size</i>	-0.468**	-2.27	-0.238*	-1.91	-0.823	-0.60
<i>Board_size</i>	0.400	1.25	0.220	1.25	-0.855	-0.53
<i>Board_indp</i>	-0.797	-0.94	-0.427	-0.84	-5.455	-1.11
<i>CEOchair</i>	0.695**	2.54	0.383**	2.39	0.788	0.76
<i>Conown</i>	-0.745	-0.86	-0.564	-1.07	-3.499	-0.76
<i>Instown</i>	-0.059	-0.15	0.014	0.06	-1.117	-0.61
<i>Stown</i>	-0.557	-1.46	-0.325	-1.44	-3.341	-1.49
<i>Mgrown</i>	-0.262	-0.64	-0.110	-0.45	-4.641**	-2.52
<i>Age</i>	0.866***	2.94	0.505***	2.89	-1.140	-0.64
<i>Zscore</i>	0.029	0.23	0.008	0.11	-2.521***	-3.03
<i>Leverage</i>	-0.051	-0.08	-0.007	-0.02	4.444*	1.79
<i>Finance</i>	0.769	1.39	0.480	1.49	8.493***	2.66
<i>Growth</i>	0.121	1.15	0.079	1.35	1.140**	2.54
<i>ROA</i>	-1.306	-0.76	-0.636	-0.62	-7.240	-1.19
<i>Size</i>	0.321***	3.04	0.170***	2.77	-0.715	1.13
<i>Accrual</i>	1.885	1.34	1.064	1.29	19.754***	2.90
<i>Weak</i>	0.687***	2.87	0.411***	2.92	0.085	0.10
<i>Big</i>	0.096	0.30	-0.009	-0.05	1.553	1.00
<i>Spec</i>	-0.586**	-2.17	-0.282*	-1.73	2.371**	2.12
Constant	-3.647	-1.44	-2.028	1.41	36.726**	2.20
IndustryDum	Yes		Yes		Yes	
YearDum	Yes		Yes		Yes	
LR (<i>prob</i>)	110.26*** (0.000)				74.23*** (0.000)	

Wald (<i>prob</i>)	---	93.45*** (0.000)	---
Pseudo R ²	0.1569	---	0.5159
N	541	541	106

*, **, ***Significant at 10, 5 and 1 percent levels, respectively. See [Table 2](#) for variable definitions.

6.4. Additional test

6.4.1. Independent female directors and financial expert

Corporate governance research has determined that independence is the prerequisite for an effective independent oversight role by directors; and greater independence leads audit committee members to fulfill their oversight responsibilities more effectively (Kelin, 2002). Moreover, financial expert members of audit committees perform their oversight functions in the financial reporting process (such as detecting significant misstatements) also more effectively (Defond et al., 2005). Goodwin (2003) points out that, in addition to independence, audit committee members need to have accounting knowledge or a financial background, because financial expertise and independence lead to the enhancement of members' ability to monitor corporate performance and the financial reporting process. Existing evidence suggests that independent and financial expert directors can improve financial reporting quality through reducing financial restatements (Abbott et al., 2004; Carcello et al., 2011; Lary & Taylor, 2012, Mohammad et al., 2018). Therefore, we expect that independent and financial expert female directors have a greater impact on the reduction in financial restatements, compared to the female executives and female directors who lack financial expertise. In this respect, we use dummy variables for independent female directors (*Ac_findp*) and financial expert female directors (*Ac_fexp*) to examine the effect of independent and financial expert female directors (Table 2 provides the definitions of these variables). The coefficients of *Ac_findp* and *Ac_fexp* in Table 7 are negative and significant. These results support prior literature and indicate that independent and financial expert female directors on audit committees are more strongly associated with the reduction in financial restatements.

Table 7, Regressions results of independent female directors and financial experts

<i>Variable</i>	<i>Coefficient</i>	<i>Z-Stat</i>	<i>Coefficient</i>	<i>Z-Stat</i>
<i>Ac_findp</i>	-1.425***	-4.24		
<i>Ac_fexp</i>			-0.946***	-2.95
<i>Ac_indp</i>			-1.667**	-2.40
<i>Ac_exp</i>	-0.732	-1.32		
<i>Ac_size</i>	-0.447**	-2.39	-0.411**	-2.25
<i>Board_size</i>	0.161	0.62	0.234	0.89
<i>Board_indp</i>	-1.075	-1.40	-1.169	-1.54
<i>CEOchair</i>	0.642***	2.62	0.533**	2.17
<i>Conown</i>	-0.434	-0.56	-0.200	-0.26
<i>Instown</i>	-0.303	-0.87	-0.226	-0.66
<i>Stown</i>	-0.502	-1.47	-0.359	-1.06
<i>Mgrown</i>	-0.088	-0.25	-0.289	-0.81
<i>Age</i>	0.925***	3.60	0.873***	3.42
<i>Zscore</i>	0.006	0.06	0.018	0.17
<i>Leverage</i>	0.271	0.46	0.290	0.51
<i>Finance</i>	0.508	1.14	0.455	1.04
<i>Growth</i>	0.167*	1.71	0.160*	1.66

<i>ROA</i>	-0.599	-0.40	-0.882	-0.60
<i>Size</i>	0.270***	2.91	0.278***	3.02
<i>Accrual</i>	1.462	1.22	1.526	1.28
<i>Weak</i>	0.585***	2.80	0.517**	2.49
<i>Big</i>	0.018	0.07	0.146	0.53
<i>Spec</i>	-0.496**	-2.06	-0.606**	-2.54
Constant	-3.170	-1.46	-3.106	-1.45
IndustryDum		Yes		Yes
YearDum		Yes		Yes
LR (<i>prob</i>)		122.19*** (0.000)		117.05*** (0.000)
Pseudo <i>R</i> ²		0.1402		0.1343
N		683		683

*, **, ***Significant at 10, 5 and 1 percent levels, respectively. See [Table 2](#) for variable definitions.

6.4.2. Audit committee gender diversity and auditor choice

[Aldamen et al. \(2018\)](#) argues that the presence of females on audit committees increases the likelihood of hiring auditors of a greater quality. Furthermore, [Lai et al. \(2017\)](#) found that the presence of at least one female member on audit committees is associated with an increase in the likelihood of hiring higher quality auditors. Moreover, prior studies demonstrate that with the increase in audit quality, the likelihood of restatement decreases ([Chin & Chi, 2009](#); [Jiang et al, 2015](#)). Thus, we investigate whether audit committee gender diversity is associated with the likelihood of hiring industry specialist auditors as a measure of audit quality ([Dunn & Mayhew, 2004](#); [Kang, 2014](#)). Given the research evidence and the negative relationship between audit committee gender diversity and likelihood of restatement, it is expected that the presence of females on audit committee increases the probability of hiring industry specialist auditors. The evidence of [Table 8](#) supports the hypothesis and indicates that there is a significant positive relationship between audit committee gender diversity measures and hiring industry specialist auditors. This finding is consistent with previous studies ([Aldamen et al., 2018](#); [Lai et al., 2017](#)) and supports their results.

Table 8, Regressions results of audit committee gender diversity and auditor choice

<i>Variable</i>	<i>Coefficient</i> [<i>Z-Stat</i>]	<i>Coefficient</i> [<i>Z-Stat</i>]	<i>Coefficient</i> [<i>Z-Stat</i>]	<i>Coefficient</i> [<i>Z-Stat</i>]	<i>Coefficient</i> [<i>Z-Stat</i>]	<i>Coefficient</i> [<i>Z-Stat</i>]
<i>Ac_fd</i>	0.861*** [3.00]					
<i>Ac_fp</i>		2.647*** [2.94]				
<i>Ac_fbi</i>			1.983*** [2.96]			
<i>Ac_fsi</i>				1.383*** [2.97]		
<i>Ac_findp</i>					1.163*** [3.31]	
<i>Ac_fexp</i>						0.648** [1.98]
Control Variable	Yes	Yes	Yes	Yes	Yes	Yes
IndustryDum	Yes	Yes	Yes	Yes	Yes	Yes
YearDum	Yes	Yes	Yes	Yes	Yes	Yes
LR	150.11***	149.75***	149.88**	149.95***	151.90***	144.69***
[<i>prob</i>]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Pseudo <i>R</i> ²	0.1700	0.1696	0.1697	0.1699	0.1720	0.1638

N 683 683 683 683 683 683

Notes: According to prior research (Chaney et al. 2004; Kang, 2014; among others), we estimate the following logistic regression model for investigating the relationship between the presence of females on audit committees and auditor choice:

$$\begin{aligned}
 Spec_{it} = & \beta_0 + \beta_1 Ac_fd_{it} + \beta_2 Ac_indp_{it} + \beta_3 Ac_exp_{it} + \beta_4 Ac_size_{it} + \beta_5 Board_size_{it} \\
 & + \beta_6 Board_indp_{it} + \beta_7 CEOchair_{it} + \beta_8 Conown_{it} + \beta_9 Instown_{it} + \beta_{10} Stown_{it} \\
 & + \beta_{11} Mgrown_{it} + \beta_{12} Leverage_{it} + \beta_{13} ROA_{it} + \beta_{14} Size_{it} + \beta_{15} Loss_{it} + \beta_{16} Chta_{it} \\
 & + \beta_{17} Aturn_{it} + \beta_{18} Curr_{it} + \beta_{19} Quick_{it} + Industry\ Dummies + Year\ Dummies + \varepsilon_{it}
 \end{aligned}$$

*, **, *** Significant at 10, 5 and 1 percent levels, respectively. See Table 2 for variable definitions

7. Summary and conclusion

In this study, we investigated the relationship between audit committee gender diversity and financial restatements. Using a sample of Iranian listed companies for the period 2013-2017, we found that the presence of at least one woman on the audit committee reduces the likelihood of financial restatement. Additionally, our findings indicate that independent and financial expert female directors on the audit committee are more strongly associated with the reduction in the likelihood of financial restatement. Moreover, our results reveal that audit committee gender diversity can increase the likelihood of hiring higher quality auditors.

The findings of this study make three important contributions. First, this study contributes to the growing literature on board gender diversity and financial restatements (Abbott et al., 2012; Wahid, 2018). Furthermore, previous studies examined the effects of audit committee characteristics (such as financial expertise, independence, size and the frequency of meetings) on financial statement restatements (e.g., Abbott et al., 2004; Carcello et al., 2011), but gender diversity as an audit committee characteristic was not examined. This being so, the present study bridges an important research gap by examining the effect of gender diversity on the audit committee, as one of the important subgroups of the board, on financial reporting. Apart from this, our study adds to the literature on the effect of board gender diversity on the selection of auditors of a higher quality (Lai et al., 2017). Second, by investigating the effect of independent and financial expert female directors, we contribute to the extant literature and provide new evidence on the more effective oversight role and greater ability of independent female directors and financial expert female directors, respectively, that is compared to female executives and female directors without financial expertise; which has been significantly disregarded in prior research. Furthermore, our findings are consistent with the literature on gender diversity which suggests that women perform better in a monitoring role, are more conservative and make more ethical decisions. Also, the results are inconsistent with critical mass theory and show that female directors are not merely tokens; even one female director can reduce the likelihood of financial restatement. Third, the practical implications of this study support the notion that gender diversity on the board and its subgroups such as the audit committee is an important issue in corporate governance. Considering our research findings, we suggest that the presence of female directors can improve corporate governance in developing countries, where governance and investor protection mechanisms are weak (e.g., Iran). In particular, the findings of this study send positive signals to the supervisors and policy makers in developing

countries regarding recommending or requiring gender diversity in audit committee composition.

This study has some limitations which suggest directions for ongoing studies. First, we used data from an emerging market (Iran), so our findings may not be generalizable outside of Iran, and where the hypothesis must be tested further. In particular, in western countries, the presence of females in leadership and management positions is stronger than in Islamic countries (e.g., Iran). Regarding the low presence of females on audit committees in Iran, this study facilitates conducting future research on this topic in the other countries, where the presence of female directors on the boards and audit committees is stronger. Second, the fact that board gender diversity is not mandatory in the data we used, provides an opportunity to compare female directors' economic effect in countries that require gender diversity on the boards with those that do not impose such requirement. Our study contributes to the heated debate on whether mandatory and non-mandatory quotas for women in the boardroom lead to the same consequences. Finally, future research can investigate whether the other characteristics of females on boards and audit committees (such as tenure, education, age, etc.) can affect the likelihood of financial restatements. In addition, a promising scope for future research is a further investigation into the effect of female CEOs and CFOs on the likelihood of financial restatements in emerging markets, because they are directly engaged in management practices.

Notes

1. The annual reports of the companies in the TSE are available at the research, development and Islamic studies center (www.RDIS.ir/CompaniesReports.asp) and (www.Codal.ir).
2. The Rahavard-e-Novin database is the most comprehensive database in the Iranian capital market. The full version of this database contains financial reports and information on the capital market. It further provides various options for essential technical analysis (Hesarzadeh & Bazrafshan, 2018).
3. Due to the improper disclosure of audit committee meetings, we are not able to control for the frequency of audit committee meetings variable in the model. Nonetheless, the three other variables of audit committee (independence, financial expertise and size) are controlled.
4. The international big audit firms (BIG4) have not set up their activities in Iran (see, Bagherpoor et al., 2014; MohamadRezaee & Mohd-Saleh, 2018). The Audit Organization of Iran is a government entity which is known as the largest audit firm in Iran. Therefore, similar to Hesarzadeh and Bazrafshan (2018), we classify audit firms in two groups of big (the audit organization) and small (the other audit firms).
5. By obtaining the fitted values from the regression on the potential determinants of female directors on the audit committee, this paper matches each firm-year observation to another one with the closest fitted value (within 5 percent) in the same year and the same industry, following Lawrence et al. (2011) and Hesarzadeh and Bazrafshan (2018).
6. Ideally our sample should have comprised 172 firm-year observations (86 firm-year observations in each group), because in our full sample there were 86 firm-year observations with at least one female director on the audit committee. However, due to unavailability of a nearest neighbor for every firm-year observation, our sample is reduced to 106 firm-year observations (53 firm-year observations in each group).

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