

# Journal of International Accounting, Auditing and Taxation

## Audit committee and audit quality: An empirical analysis considering industry expertise, legal expertise and gender diversity

--Manuscript Draft--

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|-------------------------------|--|
| <b>Manuscript Number:</b>     | JIAAT_2019_22R3  |
| <b>Article Type:</b>          | Research Paper   |
| <b>Keywords:</b>              | Audit quality; industry experts; audit committee; legal expertise; Gender Diversity; Jordan  |
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| <b>Abstract:</b>              | <p>The extant literature and corporate governance regulations suffer from a tight focus on audit committee (AC) financial expertise as a mean of improving the AC's oversight role. However, there is a lack of evidence about other kinds of expertise that might be important for AC effectiveness which could contribute to the quality of financial statements. This study examines whether AC industry expertise and AC legal expertise have an impact on audit quality in a developing country (Jordan). Furthermore, mixed and inconsistent findings regarding the role played by female directors and the peculiarity of the Jordanian context creates a motive to examine the effect of AC gender diversity on audit quality. By utilizing 1,035 firm-year observations, using two proxies to capture audit quality, and employing different estimation methods, this study highlights the importance of AC industry expertise in ensuring high audit quality. AC legal expertise and AC gender diversity have no significant effect on audit quality. This study offers a valuable contribution to the literature, and also has implications for policy-makers in Jordan and other countries with similar institutional environments to consider for future regulatory reform.</p> |
| <b>Response to Reviewers:</b> |  |

Not required per instructions of Editor Robert K. Larson

Not required per instructions of Editor Robert K. Larson

Not required per instructions of Editor Robert K. Larson

## Cover Page

### Paper title:

Audit Committee and Audit Quality: An Empirical Analysis Considering Industry Expertise,  
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**We confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.**

## **Audit committee and audit quality: An empirical analysis considering industry expertise, legal expertise and gender diversity**

### **Abstract**

The extant literature and corporate governance regulations suffer from a tight focus on audit committee (AC) financial expertise as a mean of improving the AC's oversight role. However, there is a lack of evidence about other kinds of expertise that might be important for AC effectiveness which could contribute to the quality of financial statements. This study examines whether AC industry expertise and AC legal expertise have an impact on audit quality in a developing country (Jordan). Furthermore, mixed and inconsistent findings regarding the role played by female directors and the peculiarity of the Jordanian context creates a motive to examine the effect of AC gender diversity on audit quality. By utilizing 1,035 firm-year observations, using two proxies to capture audit quality, and employing different estimation methods, this study highlights the importance of AC industry expertise in ensuring high audit quality. AC legal expertise and AC gender diversity have no significant effect on audit quality. This study offers a valuable contribution to the literature, and also has implications for policy-makers in Jordan and other countries with similar institutional environments to consider for future regulatory reform.

*JEL classification:* M41, M42, G34, N45.

**Keywords:** Audit committee; audit quality; industry experts; legal expertise; gender diversity; Jordan.

## **1. Introduction**

In the early 1990s, Jordan launched the privatization program aimed at improving the efficiency and competitiveness of the business entities (especially the state-owned firms<sup>1</sup>), attracting more domestic, Arab, and foreign investments by opening up the markets and abolishing the state monopoly. Since that time, the Jordanian government has maintained a continuing interest in promoting effective corporate governance practices to strengthen the economy through long-term investment. Furthermore, unlike most other countries in the region, Jordan is characterized by political stability and a relatively developed financial market. This makes Jordan an attractive place for foreign investments. For example, recently many foreign investments have shifted to Jordan from several neighboring countries that experienced political instability (like Lebanon and Iraq) and political revolutions during the so-called “Arab Spring” (like Egypt, Syria, Libya, and Tunisia). These events, among others, have raised the profile of the external audit function as a means of boosting investors’ confidence in the financial statements.

On the other hand, the Jordanian Code of Corporate Governance (2008) (JCCG, hereinafter) has put many responsibilities on the shoulders of the audit committee (AC, hereinafter) as a key corporate governance component to ensure sound corporate governance. More specifically, ACs are responsible for overseeing the work of the auditors and liaising with the managers and the auditors in order to ensure high audit quality. If the AC is effective, not only will management be less aggressive, but also the auditor will deliver high audit quality to satisfy the AC’s demand. Moreover, the litigation risk in Jordan is weak compared with developed countries, possibly decreasing the auditor’s incentive to perform a high-quality audit

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<sup>1</sup> For example, Arab Potash co., Phosphate co., Jordan Hotels and Tourism, Jordan Cement Factory, and Royal Jordanian.

(DeFond & Zhang, 2014; Francis, 2006) and, consequently, increasing the importance of effective ACs (among other mechanisms) to ensure that auditors deliver high audit quality.

The extant studies and regulations posit that AC financial experts are likely to be more effective and, thus, positively affect audit quality (Krishnan & Visvanathan, 2009). However, little is known about other knowledge/experience that might be important for AC effectiveness that could contribute to the integrity of financial reports. DeZoort and Salterio (2001) pointed out that different knowledge bases of AC members lead to differences in their judgements and their relations with auditors. Therefore, this study examines AC industry expertise and AC legal expertise, which are largely neglected in the literature as well as in the extant corporate governance recommendations. In particular, this study examines whether these two AC attributes have an impact on audit quality in one of the developing countries characterized by a weak legal liability and an evolving financial market.

In Jordan, the JCCG (2008) neither addresses the role of legal nor industry expertise in the AC, despite the growing debate concerning the importance of these AC attributes. Nevertheless, this study posits that AC industry experience is important because the understanding of accounting estimates and oversight of the external auditor are often contingent upon the understanding of a company's operations (i.e. industry knowledge). Similarly, AC members with legal experience can play a valuable role in countering litigation risk and taking action when wrongdoing occurs. In other words, AC legal expertise is expected to be fully aware of the consequences of legal liability that can arise from misrepresentation of financial statements.

In addition, countries in the Middle East and North Africa (MENA, hereafter) witnessed a significant development in economic and social structure resulting from modernization. These countries are beginning to recognize the necessity of developing female talent in organizations up to the board level (Terjesen, Sealy, & Singh, 2009). However, women in these countries still suffer from discrimination, unequal status, and low levels of participation in the labor market. Like other MENA communities, the Jordanian community is a male-dominated (patriarchal community) and still presumes that women should prioritize their family at the expense of their work (Orser & Leck, 2010). Thus, the motivations for investigating effect of AC gender diversity on audit quality are as follows. The first motivation stems from the recent series of regulations and policy recommendations across the world designed to increase female participation in boards of directors. These recommendations are based on the belief that female directors do better in monitoring, as they are more sensitive towards risk (Schubert, 2006), more trustworthy than men (Heminway, 2007), and have stricter ethical standards (Lai, Srinidhi, Gul, & Tsui (2017).

Second, although the role of gender diversity in the board of directors is examined in the literature carried out in developed countries, there is a curiosity to know the role played by women in such a developing and patriarchal community. Third, the domination of family firms in Jordan raises a concern about the effectiveness of female AC members who are often related to the controlling families. In other words, the majority of high-profile studies highlight a positive impact of gender diversity on directors' effectiveness as it translates to higher earnings quality (Oradi & Darjezi, 2019), reduces the level of conflict (Nielsen & Huse, 2010), and improves the quality of disclosures (Gul, Srinidhi, & Ng, 2011). However, there is a lack of

evidence regarding whether gender diversity holds the same positive impact if the independence criterion is violated, such as where female directors are linked to family owners<sup>2</sup>.

To obtain a holistic view, the study uses two proxies to capture audit quality: the level of audit fees and Big-4 audit firms. Utilizing 1,035 firm-year observations, the study highlights the importance of AC industry expertise in ensuring high audit quality. AC legal expertise and AC gender diversity are also examined, but have no significant effect on audit quality. This result holds while the study employs different estimation methods and also scales audit fees according to firm size, which is important to reduce spurious correlations and heterogeneity of variance due to firm size.

This study contributes to the literature and has implications for regulatory bodies and the business entities in the following ways. Jordanian regulations, particularly the corporate governance code, are still developing. So, the findings, especially regarding the role of AC industry expertise, provide valuable feedback to policy-makers and could be a valuable input to assess the current regulations and to consider future governance reform. Moreover, although the growing debate concerning the importance of AC legal expertise, as highlighted by Krishnan, Wen, and Zhao (2011) in the US market, our findings suggest that this might not be the case in a developing market where the legal system is far from being strong and where litigation risk is still low (i.e. where the legal consequences of wrongdoing might not be a major concern as compared to developed markets). Although these contextual factors could be the main reason for the differences between this study's results and those of Krishnan et al. (2011), it is worth mentioning that Krishnan et al. (2011) used data for two years only (2003 and 2005). From a methodological perspective, such a cross-sectional approach might give biased estimates due to the endogenous determination of company characteristics and the dependent

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<sup>2</sup> All women in the study's sample are non-independent as they are members of the controlling families.

variable (Vafeas & Waagelein, 2007). Therefore, we use a panel data approach comparing a firm to itself at a different time period (Wooldridge, 2010).

The study contributes to the corporate governance literature by tackling AC dimensions not yet thoroughly investigated in the literature or addressed by corporate governance recommendations. Notably, this study injects the literature with new evidence from a civil law country characterized by a developing financial market, a family business concentration, a weak investor protection, and a low litigation risk. In the same vein, this study also contributes to the audit fee literature by identifying AC industry expertise as an additional determinant of audit fees. Furthermore, our findings regarding other AC attributes such as independence, financial expertise, size, and frequency of meetings contribute to the literature of AC effectiveness and audit quality, and further support the conclusions made by two review studies on AC (Bedard & Gendron, 2010; Ghafran & O'Sullivan, 2013)<sup>3</sup>.

Moreover, in some cases the Jordanian regulators copy legislations from Western countries without giving due consideration to the peculiarities of the local business environment<sup>4</sup>. Given that AC legal expertise does not show a significant relationship with audit quality, regulators should consider this attribute carefully before including it in the Jordanian governance framework. Companies also might consider AC industry expertise in order to enhance the quality of their financial reporting, as this outcome has implications for public companies' nomination committees. Finally, the feedback from this study can also apply to

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<sup>3</sup> Most studies in these reviews found that AC independence, AC financial expert, and AC size have a positive relationship with audit quality.

<sup>4</sup> For example, the JCCG recommendations regarding the structure of AC are similar to the recommendations of Cadbury Report (1992), the UK Combined Code of Corporate Governance (2003), and section 301 of the US Sarbanes Oxley Act (SOX). Also, the Code recommendations regarding board characteristics are similar to the recommendation of Cadbury Report (1992), Higgs Report (2003), and section 101 of SOX.

other countries with similar contextual factors to those in Jordan, especially countries in the MENA region that share a common culture, religion, language, and tribal and family traditions.

The rest of this paper is organized as follows. The next section discusses the audit quality and its measurement. This is followed by the hypotheses development section. Methodology and empirical analysis are presented in sections 4 and 5, respectively. The paper ends with the conclusion.

## **2. Audit quality: background and measurement**

Audit quality in Jordan received more attention after establishing the Jordan Association of Certified Public Accountants (JACPA) in 1987, which aimed to improve the audit profession in the market. The privatization programme launched in 1995 has particularly raised the profile of the external audit function as a means of boosting investors' confidence in the financial statements. The privatization programme aimed at creating a proper environment to attract investors and strengthen the financial market via long-term investment. Therefore, the privatization process placed pressure on the authorities to adopt international accounting practices and created the need for high-quality auditing (Al-Omari, 2010).

The agency problem that arises between owners and managers, due to information asymmetry between them, is the main motivation for the external audit. The external audit function plays a significant role in corporate governance systems as it bridges the gap between those who prepare financial information (management) and those who use it (shareholders). It is considered a key monitoring device because it enhances the quality of financial statements and provides assurance to investors about the company's status (Cohen, Krishnamoorthy, & Wright, 2002; Habib & Jiang, 2015; Piot, 2001). Jensen and Meckling (1976) argued that because agents will seek to maximize their own benefits at the expense of principal, external auditors have a role in aligning principal-agent interests and reducing the information

asymmetry between them. External auditors also have a vital role in mitigating the principal-principal conflict between majority and minority shareholders. This is often the case in developing countries where companies tend to be characterised by concentrated ownership. In these circumstances, the external audit function helps create confidence and assurance that the interests of minority shareholders are sufficiently protected from exploitation by controlling shareholders (Fan & Wong, 2005).

Conversely, Jeong and Rho (2004) predicted that auditors tend to pay less attention to providing high audit quality if the institutional setting does not demand it, such as situations where auditors are less likely to be sued when financial statements are misrepresented. In such a situation, auditors may exert less effort to curb management misbehavior and are more likely to behave opportunistically themselves in order to retain and attract clients. Investors in Jordan do not normally issue complaints against auditors, so lawsuits against them are uncommon and low litigation risk exists compared to developed countries (JACPA, 2016). At the same time, Big-4 audit firms in Jordan might pay less attention to their reputation capital - comparing to developed markets - because they operate through local affiliates (except for Deloitte) and they have a low market share (only 35% of the non-financial listed companies are audited by the Big-4 firms). These features of the Jordanian context might decrease the incentive of auditors to perform high quality audits and consequently increase the importance of effective ACs in ensuring that auditors are delivering credible audit quality by demanding broad and intensive audit work from auditors.

Audit quality can be defined as a process of detecting and reporting material misstatement (DeAngelo, 1981). DeFond and Zhang (2014) extended the definition of audit quality beyond the simple detection of accounting standard violations to include showing how faithfully financial statements reflect firms' underlying economics. It is difficult to assess audit quality ex-ante because the amount of assurance provided by auditors is unobservable. The

only observable outcome of the audit process is a common form of audit reports, and most of these reports are standard clean opinions (Francis, 2004).

In the literature, there are two sides when considering audit quality: demand and supply. The input-based proxies (auditor-client contracting features which mainly includes audit fees and audit firms) are more appropriate when considering the demand side of audit quality<sup>5</sup> (DeFond & Zhang, 2014). This study is interested in the demand side of audit quality; i.e., do industry expert, legal expert or female directors “demand” high audit quality? Next is a brief discussion of the common demand-side proxies (audit fees and Big-4 audit firms).

The level of audit fees is widely used in high-profile studies as an indication of audit quality (Abbott et al., 2003; Carcello et al., 2002; Ghafran & O'Sullivan, 2017; Sultana, Singh & Rahman, 2019; Zaman, Hudaib, & Haniffa, 2011). A high level of audit fees implies higher audit quality, *ceteris paribus*, either through more audit effort exerted (i.e., more audit hours) or through a greater expertise of the auditor (higher billing rates) (Francis, 2004). Furthermore, both the Cadbury (1992) and the Chartered Accountants' Joint Ethics Committee (1993) reports warn against the likelihood that audit quality might be compromised by low fees. In support of the above views, Lynn Turner (2005, p. 5), former Chief Accountant at the Securities and Exchange Commission (SEC), wrote:

*Certainly throughout the 1980s and 1990s, corporations, sometimes with the assistance of their audit committees, twisted the arms of independent auditors to reduce their audit fees. Our experience includes corporations who competitively bid their independent audit work solely to reduce their fees well below levels that could generate a reasonable return for the auditors. In turn, the audit firms reduced the level of work they needed to perform in their role as gatekeepers for investors. Inevitably inferior audits resulted.*

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<sup>5</sup> Supply-side proxies (e.g., accruals and going concern opinion) are less appropriate given the rationale of the study. In addition, these proxies are not without limitations. Discretionary accruals tend to have high measurement error (Elshafie & Nyadroh, 2014), and consensus is lacking on how these proxies should be measured. For example, accruals can be measured using an absolute value, assigned value, the Jones model, the modified Jones model, and/or performance matching (Defond & Zhang, 2014).

Regarding Jordan, Al-Khaddash, Al-Nawas, and Ramadan (2013) recommended that Jordanian companies should offer high fees as an incentive for auditors to be satisfied and to enable them to do better work. They argue that if an auditor who received high fees delivers poor audit quality, he would lose face and feel shame. This argument is also supported by Alhababsah (2016), who acknowledges the relevance of audit fees level as a measurement of audit quality in Jordan. Alhababsah (2016) reached this conclusion based on responses from 199 members of boards of directors, ACs, and auditors.

Also, the relationship between the size of audit firm and audit quality has been largely investigated. Many prior empirical studies support the view that the Big-4 audit firms provide higher quality audits (Alzoubi, 2018; DeAngelo, 1981; Francis & Yu, 2009). Big-4 audit firms have the ability and incentive to deliver a high audit quality because they have greater reputations to protect (Francis, 2004). When these audit firms have 'more to lose' from supplying a lower-than-promised level of audit quality, clients properly use size as a quality surrogate (DeAngelo, 1981; Francis, 2004; Khurana & Raman, 2004). Moreover, Big-4 audit firms have adequate human and technology resources which increase their ability to do more intensive and powerful audit tests. Finally, Big-4 audit firms are more independent of their client (DeAngelo, 1981) and have a higher standard control system (Khurana & Raman, 2004; Francis, 2004).

However, using Big- 4 proxy alone, especially in a context like Jordan, might not be sufficient as an indication of audit quality. First, KPMG, EY, and PwC operate in Jordan through local affiliates. While these affiliates have a strong reputation and technical abilities comparing to other local audit firms, they might not have the same quality control standards as the Big-4. Second, using the Big-4 and non-Big-4 dichotomy fails to capture quality variation for a large number of firms because the prior relevant studies suggest a similar level of audit quality exists in each category. DeFond and Zhang (2014) noted that while using Big-4 as a

discrete measure still provides an indication of audit quality, it assumes that all companies audited by the Big 4 have high audit quality without considering variation in the audit quality between these firms. In summary, given the above discussion, this study considers audit fees proxy as the main regression model variable to capture audit quality while Big-4 proxy is used as a supportive model variable.

### **3. Hypotheses development**

ACs have assumed greater importance since the 1990s, particularly after the enactment of relevant regulations such as the Cadbury (1992), Higgs (2003), and Smith (2003) reports in the UK, SOX (2002) in the USA, and the Best Practice Guide (1997) in Australia, which were a reaction to corporate failures and scandals. In Jordan, the corporate governance code also assigned many responsibilities to ACs. All these regulations emphasized the necessity of ACs' existence in the corporate governance system (Ghafran & O'Sullivan, 2012; Turley & Zaman, 2004). Although the board of directors is expected to act as the overall monitor of management behavior, it is the AC that is specifically charged with the oversight of financial reporting and auditing activities (Alzeban & Sawan, 2015; Gendron & Bédard, 2006; Jaggi, & Leung, 2007). Therefore, given this role of ACs, it is expected to contribute to improving the quality of audit service, such as by demanding a broader audit scope. Therefore, given that the literature suffers from a tight focus on the code-recommended attributes of ACs, this study considers the role of three AC characteristics in relation to audit quality (industry expertise, legal expertise, and gender diversity) that are not recommended in the JCCG and received minimal attention in the literature.

#### **3.1. Industry expertise**

Industry expertise of directors was brought to the forefront of the discussion on corporate governance during the latest financial crisis (2008–2009). For example, Citigroup

had a lack of finance and investment experts in its board which had a significant adverse effect on its enormous write-downs of mortgage-related asset value (Wang, Xie, & Zhu, 2015). Consistent with agency theory proposition (Jensen & Meckling, 1976), it has been argued that industry expertise enables directors to better understand the firm's operation and financial conditions, better analyze the relevant information and, therefore, provide better monitoring role (Wang et al., 2015). Bédard and Gendron (2010) pointed out that industry expertise may help AC members in fostering their monitoring competencies resulting in effective overseeing of the firm's financial reporting process.

Moreover, as financial statements usually contain numerous estimates, industry expertise is likely to help the AC understand and evaluate industry-specific estimates (Cohen, Hoitash, Krishnamoorthy & Wright, 2014). For instance, warranty obligations are related to the industry and product specifications. Thus, industry expertise is essential to ensure the accuracy of the warranty estimate. Similarly, in pharmaceuticals, testing of revenue reserves is more complex in the US because it requires examining current and expected reimbursement rates from Medicaid<sup>6</sup>. Therefore, an AC which includes industry-expert can better understand an industry's complexities and will communicate more effectively with the auditor (Cohen et al., 2014). Cohen et al. (2014) concluded that industry expertise, as compared to a lack of such expertise, will demand a higher level of audit quality, resulting in higher audit fees.

On the other hand, AC industry expertise implies that AC members share a similar experience with management. This might make the directors more sympathetic to the challenges and difficulties facing managers, resulting in weak monitoring role and more adverse behavior by managers. In the same vein, prior experience in a firm's industry may potentially reduce the degree of effective separation between directors and management,

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<sup>6</sup> Medicaid is a joint federal and state program in the US that helps with medical costs for some people with limited income and resources.

because they may have common friends and acquaintances from within the industry, belong to the same social circle for work-related reasons (e.g., industry conventions or trade shows), or have crossed paths in their careers (Wang et al., 2015). This argument could be more relevant to small communities like Jordan where all listed companies are based in one city (Amman) and where people have strong social relationships.

Based on the above competing arguments, the study draws the following hypothesis:

*H1: There is a relationship between the audit committee industry expertise and audit quality.*

### **3.2. Legal expertise**

Companies could appoint directors with legal expertise to counter litigation risk and to deal with specific legal issues (Krishnan et al., 2011). As directors with legal expertise understand legal liability that can arise from low-quality information, they will be more alert to it and, therefore, it is expected that their “natural attention and interest will be to attend to legal risk, giving more support to compliance and internal controls” (Langevoort, 2007, p. 1841).

Krishnan et al., (2011) argued that ACs with a legal expert would be particularly focused on liabilities arising from misstatements because of their sensitivity to litigation risk and because they are charged with the oversight of financial reporting and auditing activities. Thus, while it is expected that all directors should be concerned about litigation risk arising from inaccurate or misleading financial statements; the legal expert is particularly likely to be more sensitive to it. Companies could appoint lawyer-directors not to directly improve the quality of financial statements, but to deal with specific legal issues relating, for example, to patents and mergers and acquisitions. In this case, a lawyer—director can indirectly help in enhancing audit quality through inquiry and questioning, and provide direct hands-on monitoring even though they do not provide formal legal advice (Krishnan et al., 2011). Moreover, Krishnan et al. (2011) suggest that although companies usually have corporate counsel (either in-house or

outside counsel) to ensure compliance with laws; lawyer-directors on an AC provide stronger monitoring than that provided by corporate counsel, as they are independent persons and not employees of the firm.

On the other hand, as part of their duties, AC members should oversee auditing process, liaise and meet with auditors to discuss audit-related issues, and intervene to solve the disputes that may arise between managers and auditors. Therefore, accounting and financial background is important for AC members to do their task properly. AC legal experts usually do not have accounting background and consequently they likely will fail in playing an effective monitoring role.

Finally, it is worth mentioning that the growing debate concerning the importance of AC legal expertise came mainly from the US, a robust litigious country. However, given the strong relationship between the quality of financial statements and the likelihood of lawsuits (Palmrose & Scholz, 2004), one would ask: Is this the case in a developing market where the legal system and litigation risk are still weak (i.e. wherein the legal consequences of wrongdoing might not be a major concern)? Hence, the study tests the following hypothesis:  
*H2: There is a relationship between the audit committee legal expertise and audit quality.*

### **3.3. Gender Diversity**

Despite the development in economic and social structure resulting from modernization, discrimination against women in MENA countries is still a challenge (Metcalf, 2008). Women in these countries suffer from unequal status, and their participation in the labor market is still as low as 23% (World Bank, 2017). Like other MENA communities, the Jordanian community is still traditional in different aspects and is rooted in its proper culture (El Hajj, Abou Moussa, & Chidiac, 2017). The community is male-dominated and still presumes that women are to prioritize their family ahead of their work (Orser & Leck, 2010).

However, while social and cultural barriers to men and women being regarded equally still persist (Miles, 2002), Jordan strongly supports gender equality in education and the employment opportunities for women in Jordan are increasing as globalization continues. Various national strategies such as the National Employment Strategy 2013-2020 and the Poverty Reduction Strategy 2013-2020 emphasized the importance of increasing female participation in the labor market. Women in Jordan enjoy economic, social, and political rights, and are slowly reaching influential political positions, which has been made possible by the political will and support of His Majesty King Abdullah II. In the 2016 parliamentary elections, 20 women (15% of total seats) won compared to one woman only in the 1989's election.

The difference between genders is widely documented in the literature, especially with regards to managerial style, decision-making, and the communications process (Ittonen, Miettinen & Vähämaa, 2011). Thus, studies find that the presence of females on boards improves the monitoring process, leading to more effective boards (Damak, 2018; Gul et al., 2011; Terjesen et al., 2009, Wahid, 2019). Female directors strengthen the corporate governance system, improve the quality of disclosures (Gul et al., 2011), improve earnings quality (Oradi & Darjezi, 2019; Srinidhi et al., 2011), reduce the probability of loan default and the cost of debt (Usman, Zhang, Makki, & Khan, 2019), and reduce the level of conflict (Nielsen & Huse, 2010).

In particular, female directors are generally considered as more risk-averse than men, resulting in more conservative decisions (Watson & McNaughton, 2007; Zalata, Ntim, Aboud, & Gyapong, 2018). They are also considered more trustworthy than men, thereby less likely to manipulate financial statements (Heminway, 2007). Furthermore, women are more sensitive to losses than men, with more attention paid to risk management (Schubert, 2006) and also a sign of deviation from the typical male-dominated boards, which can bring informational and social diversity (Dezsö & Ross, 2012). Accordingly, the conservative mindset and ethical leadership

of women may improve the internal control environment and contribute to more conservative and higher standards of financial reporting (Ho, Li, Tam, & Zhang, 2015).

In this vein, Oradi and Darjezi (2019) examined the relationship between the presence of female members in the AC and the incidence of financial restatements. Their results suggest that the AC's gender diversity increases the likelihood of hiring higher quality auditors and, therefore, reduces the likelihood of restatements. This finding is consistent with Lai et al., (2017), who found that women in the AC in the US contribute positively to audit quality by demanding more audit effort, and by choosing high-quality auditors. Similarly, using a sample of 6,132 US firms over the period from 2000 to 2010, Wahid (2019) found that board gender diversity is associated with a lower likelihood of financial manipulation. These findings are consistent with the notion that women perform better in a monitoring role. However, Lim, Lye, Yuen, and Teoh (2019) found a negative relationship between the proportion of women in the board and financial performance. This negative effect might be due to issues of tokenism, gender stereotypes, and the glass ceiling factor in Malaysia (Lim et al., 2019).

Owing to the importance of gender diversity in the board, many countries acknowledge it as a key aspect of the corporate governance system. Consequently, some countries established mandatory quotas (determined minimum numbers of directors' seats that should be allocated to females) while others merely offered recommendations and guidelines for gender diversity. For example, France and Norway require 40% of board seats should be allocated to female directors<sup>7</sup>. The UK Corporate Governance Code (2010) recommends organizations giving due regard to diversity, including gender diversity when making appointments to the board. In Jordan, appointing female directors is still voluntary as the regulations are yet to recommend gender diversity in the board of directors or in any board sub-committees.

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<sup>7</sup> As of 2016, other countries having gender quotas for listed firms include Belgium, France, Germany, Iceland, India, Italy, Malaysia, Netherlands, and Spain.

However, although there is widespread agreement that gender diversity in the board of directors improves its performance, some evidence from the management and behavioural literature indicates an adverse role of gender diversity within teamwork. Earley and Mosakowski (2000) suggested that members of different gender tend to communicate less frequently as they are less likely to share the same opinions. Similarly, Tajfel and Turner (2004) and Williams and O'Reilly III (1998) suggested that the groups which contain gender diversity are less cooperative and experience higher emotional conflicts. Furthermore, some literature find that gender diversity is associated with higher levels of conflict (Williams & O'Reilly, 1998) and delay in decision making (Carter, D'Souza, Simkins, & Simpson, 2010). Adams and Ferreira (2009) report that board gender diversity is negatively associate with financial performance. This finding is consistent with the argument that too much board monitoring can be detrimental to shareholder value (Almazan & Suarez, 2003; Adams & Ferreira, 2007).

In the Jordanian context, the domination of family firms raises two competing viewpoints. From one side, family-related directors have a reputational concern (Anderson & Reeb, 2003) that motivates them to protect firm values. This reputational concern is widely relevant to the Jordanian environment where a firm name in many cases is linked to a family name. As the Jordanian society generally still has tribal roots, people tend to boast of business success, and they could feel shame in the event of business failure. In a recent study from Jordan, Alhababsah (2019) noted that the owners of a failed business have a concern with gloating (*schadenfreude*) by other competitors. In the same vein, Alhababsah (2019) added that most family members who control businesses are well known in the society, and, therefore, they try to maintain their social status. Thus, these reputational concerns create a commitment among family members to maintain the family name and avoid abusing their power to obtain private benefits. Consequently, this might encourage family-related female directors to demand

extensive and thorough audit work to avoid the negative consequences (e.g., reputational damage) of presenting fraudulent financial statements.

On the other side, the domination of family firms raises a concern about the effectiveness of female members in the AC who are likely related to families. In such a situation, family-related female members in the AC could be unwilling (or hesitate) to exert effective monitoring or challenge the managers who often belong to the same family. In other words, family-related directors might play a passive rather than active monitoring role.

Based on the above discussion and considering the Jordanian context, the study proposes the following hypothesis:

*H3: There is a relationship between audit committee gender diversity and audit quality.*

## **4. Methodology**

### **4.1. Sample description**

The population of the study comprises the listed non-financial companies in the Amman Stock Exchange (ASE). The total number of listed non-financial firms in the ASE at the end of 2017 is 177. As presented in Table 1 Panel A, the final sample comprises 115 public non-financial firms representing 65% of the population and comparable with prior sample sizes in the literature<sup>8</sup>. Our final sample and their industrial classification are presented in Table 1 Panel B. A detailed classification of industries' sub-sections is presented in Table 1 Panel C. The study covers the period from 2009 to 2017 inclusive. The data is manually collected from annual reports, which are downloaded from the Jordanian Securities Commission.

[Table 1 near here]

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<sup>8</sup> The proportion of sample to total population was 60% in Zaman et al. (2011), 34% in Carcello et al. (2002), 29% in Goodwin and Stewart (2006).

## 4.2. Model specification

As discussed in section 2, the study employs two proxies of audit quality: audit fees and Big-4 audit firms. The audit fees model is based on the total amount paid to auditors as fees of statutory auditing (converted to natural log). As an alternative proxy of audit quality, the study also tests a relationship between Big-4 and AC characteristics by employing a binary probit regression model.

To avoid model misspecification, both models consider a wide set of variables to control<sup>9</sup> for the cross-sectional variations in audit fees and audit firms identified by prior research. The control variables used can be categorised into two groups: first, other AC attributes, which are AC independence, financial expertise, frequency of meetings, and size. Numerous previous studies document that independent AC members and AC financial experts play an effective monitoring role over auditing process and, therefore, have a significant impact on audit quality (Abbott et al., 2003; Carecello et al., 2002; O'Sullivan, 2000; Sarhan, Ntim, & Al-Najjar, 2019; Shan, Troshani, & Tarca, 2019; Zaman et al. 2011). The frequency of AC meetings and AC size also have a significant relationship with audit quality (Carecello et al., 2002; Vafeas & Weagelein, 2007; Zaman et al. 2011).

Second, company-related factors, which are client size measured by natural log of total asset, number of subsidiaries, Big-4<sup>10</sup>, leverage, profitability, risk, loss, non-audit service fees, and industry types<sup>11</sup>. Prior studies consider firm size and the number of subsidiaries as main determinants of audit fees and auditor choice as large firms and firms with many subsidiaries need more audit effort due to their business volume (Simunic, 1980; O'Sullivan, 1999). Carey

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<sup>9</sup> Control variables should be considered when conducting a regression analysis as it is essential to limit the impact of alternative explanations of the relationship under investigation (Schmitt & Klimoski, 1991) or to reduce error terms and increase statistical power (Schwab, 1999).

<sup>10</sup> Big-4 dichotomous variable is used as control variable in the audit fees model and as dependent variable in the Big-4 audit firm model.

<sup>11</sup> These control variables are expected to have an impact on the audit fees as well as on the appointment of a Big-4 audit firm (Abbott, Parker, Peters, & Raghunandan, 2003; Corbella, Florio, & Mastrolia, 2015; Fleischer & Goettsche, 2012; Francis & Simon, 1987; Lai, 2019; Leventis, & Caramanis, 2010; Niskanen, Karjalainen, & Niskanen, 2010; Zaman et al., 2011).

et al. (2000) argued that high debt levels in firms' capital structures (high leverage) increases owners' incentives to transfer wealth from the bondholder, and this, in turn, increases the demand for high audit quality. Profitability has an impact on the auditors' assessment of risk, as more audit effort is expected for clients with bad financial outcomes (Pratt & Stice, 1994). Big audit firms typically charge higher audit fees (Zaman et al., 2011). Inventory and account receivables are more difficult to audit than other tangible assets (Simunic, 1980). This justifies the rationale behind using the proportion of current assets to total assets as a measure of inherent risk. A poorly performing firm or a firm with a loss is often perceived as being riskier and has weak internal control system (Whisenant et al., 2003), so high-quality audit is needed due to the increased risk. Non-audit services might strengthen the economic bond between firms and auditors and, therefore, have a potential impact on audit quality (Audousset-Coulier, 2015). An industry variable is based on the rationale that complexity and business conditions are different between industries, and this might lead to more/less demand of audit effort. Table 2 shows how this study defines these variables and the expected direction of their relationship with the dependent variable.

As the data-set for this study is observations of 115 firms over nine years, the study uses panel data approach. Panel data approach, comparing a firm to itself at a different time period, can play an important role in controlling variables which are not observed or measured across entities, or variables that may change over the time period but not in a consistent manner (Wooldridge, 2010). Also, panel data can deal with various types of variables, including time-invariant variables that change between firms but are the same over time, such as industry code, and variables that change over time as well as between firms, such as AC industry expertise, AC legal expertise, and AC gender diversity (Wooldridge, 2010). Moreover, panel data improves the efficiency of econometrics estimates (more accurate inference of model parameters), because it offers a large number of data points, increases the degrees of freedom,

and reduces the collinearity between explanatory variables (Hsiao, 2014). The most common estimated models for panel data are fixed effects and random effects models, particularly when the number of cross-sectional units is large, and the number of time periods is small (Kennedy, 2003). The Hausman test typically provides an indication of whether random effect or fixed effect is more appropriate. In addition, robust standard error, as a common model in the absence of homoscedasticity, is taken into consideration.

## **5. Data analysis and discussion**

### **5.1.Descriptive analysis**

Table 3 (Panels A and B) presents important descriptive statistics of the study variables. It shows that the proportions of AC members who have industry expertise (AC\_INDUSTRY) and legal expertise (AC\_LEGAL) are 25% and 11%, respectively. The proportion of women in the AC (AC\_GEND) is 3.4%. Regarding other AC characteristics, 64% of AC members are independent (AC\_INDEP) and 59% of them having financial expertise (AC\_FINANCIAL). The average of AC size (AC\_SIZE) is three members and the average frequency of AC meetings (AC\_MEET) is 3.8 times per year.

[Table 3 Panel A near here]

[Table 3 Panel B near here]

### **5.2.Correlation analysis**

The correlation analysis (Table 4) does not show a collinearity threat to the interpretation of the regression coefficients of the study variables. However, from the Spearman correlation, the highest coefficient is reported between company's size and audit fee (0.66), which is expected because size is the dominant determinant of audit fees (Simunic, 1980). Furthermore, the correlation between firm size (ln\_FIRM SIZE) and AC size (AC\_SIZE) is 0.36. This correlation can be justified as large companies normally have large ACs (Coles, Daniel, &

Naveen, 2008). Finally, in order to make a robust check for multicollinearity in the model, an evaluation of the variance inflation factor (VIF) was carried out (Table 3). The VIF and tolerance levels (1/VIF) show that all values are within the acceptable level suggesting no multicollinearity problem (Gujarati, 2003). In particular, the highest VIF of 2.88 is substantially lower than 10 meaning that the study does not have symptoms of estimation problems (Chatterjee & Price, 1991).

[Table 4 near here]

### **5.3. Regression analysis**

#### **5.3.1. Audit fees model**

The study uses a panel data approach and the most common estimated models for this approach are fixed effects and random effects models (Kennedy, 2003; Wooldridge, 2010). Given that the random effect estimation method is more appropriate than the fixed effect one based on Hausman test, it is adopted as the main estimation method (Table 5, column 1). However, the outcome of the fixed effect method is consistent with the random effect one, and it still gives an indication of within-firm variations (Table 5, column 2). Column 3 in Table 5 shows the outcome of Huber-White's sandwich estimator as a common robust test in the presence of heteroscedasticity (Wooldridge, 2010).

The findings (Table 5) suggest that the proportion of AC industry expertise (AC\_INDUSTRY) has a significant positive relationship with audit quality. This result supports the argument that different experiences in the AC are important in enhancing its monitoring effectiveness (Alhababsah, 2018; Cohen et al., 2014; DeZoort & Salterio, 2001). However, the outcomes of the three estimation methods do not report a significant impact of the AC legal expertise (AC\_LEGAL) and AC gender diversity (AC\_GEND) on audit quality<sup>12</sup>.

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<sup>12</sup> Due to the overwhelming influence of large firms on different firm characteristic, this study run a further test considering the effect of firm size (by scaling audit fees according to firm size) to obtain a better indication of the effect of the study variables on audit fees. The results (non-tabulated) show no significant difference from the results presented in Table 5.

The result can mainly be justified by the dominance of family businesses in Jordan wherein the female directors are related to the controlling families and, therefore, they might be unable or hesitate to exert effective monitoring.

The finding concerning AC legal expertise (AC\_LEGAL) is contrary to Krishnan et al., (2011). The reason can mainly be linked to the difference in the contextual factors between Jordan and the US, and also might be due to the nature of the cross-sectional model used by Krishnan et al., (2011). The lack of accounting background of the legal experts might be among other potential reasons for the lack of a significant effect on audit quality<sup>13</sup>.

Although other AC variables are considered as control variables, it is worth noting that AC independence (AC\_INDEP) and AC financial expertise (AC\_FINANCIAL) have a positive effect on audit quality. These findings are consistent with agency theory propositions (Fama & Jensen, 1983) and with the previous empirical studies (Carcello et al. 2002; O'Sullivan, 2000; Xie, Davidson, & DaDalt, 2003; Zaman et al. 2011). The regression does not present significant relationships between AC meetings (AC\_MEET) and audit fees, suggesting that too frequent meetings are not necessarily an indication of diligence. They might be just to mimic other firms or to meet the code recommendations (Cohen, Gaynor, Krishnamoorthy, & Wright, 2007) and, therefore, they might be futile and unduly. A similar result is also shown for AC size (AC\_SIZE).

[Table 5 near here]

### **5.3.2. Big-4 model**

When the dependent variable is a dichotomous variable (coded as 1 if the company audited by one of the Big-4 audit firms, 0 otherwise), ordinary least squares (OLS) regression may not be able to fulfil the OLS assumptions and may lead to inefficient estimation (Pampel,

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<sup>13</sup> All AC legal experts in our sample have no accounting or finance background, so we are unable to run further test for the incremental contribution of AC legal experts who are at the same time financial experts. In the US, the proportion of AC members who have both expertise is only 6% in 2003 and 8% in 2005 (Krishnan et al., 2010).

2000; Menard, 2002). Menard (2002: V) pointed out that "... with a dichotomous dependent variable, assumptions of homoskedasticity, linearity, and normality are violated, and OLS estimates are inefficient at best". Thus, transforming the dichotomous variable into a probit model can overcome this dilemma.

Table 6 presents binary probit regression model which tests whether the likelihood of appointing a Big-4 audit firm increases with the presence of AC industry expertise, AC legal expertise, and AC gender diversity. Interestingly, as presented in Table 6, the outcome of this model is consistent with the audit fees model. So, employing Big-4 audit firm model also confirms a significant positive relationship between AC industry and audit quality, while AC legal expertise and AC gender diversity do not show a significant relationship.

[Table 6 near here]

## **6. Conclusion and potential research avenues**

This study goes beyond the code recommendations and examines the effect of other AC attributes (industry expertise, legal expertise, and gender diversity) on audit quality. In addition to the fact that AC industry expertise and AC legal expertise have been neglected in the corporate governance recommendations, many researchers call for considering new AC expertise beyond the financial one. This study is the first to consider the impact of AC industry expertise and AC legal expertise in a less litigious, developing country. Our findings highlight the importance of AC industry expertise in ensuring high audit quality. AC legal expertise and AC gender diversity, however, have no significant effect on audit quality. This result holds while the study employs different estimation methods and also scales audit fees according to firm size.

This study offers several important contributions. First, although the ongoing debate about the importance of AC legal expertise is highlighted by Krishnan et al. (2011), our finding suggests that this might not be the case in a developing market where the legal system is far

from being strong and where litigation risk is still low. Second, while AC industry expertise increases the concern of a weak AC monitoring role in a context like Jordan, it seems that the benefits of this expertise outweigh its drawbacks. On the other hand, given that AC industry expertise is neglected by corporate governance recommendations, this finding provides useful feedback to policy-makers and could be a valuable input to assess the current regulations and to consider future governance reforms. Nomination committees of listed firms might benefit from this outcome when considering the appointment of directors.

Third, although the majority of literature reports a positive impact of female directors, this study reveals that female directors might not hold the same positive impact if the independence criterion is violated. In other words, family-related female directors might not be willing (and/or able) to exert effective monitoring or challenge the managers, who often belong to the same family. Fourth, our results offer further empirical evidence in the literature on the relationship of audit quality and AC independence, AC financial expertise, AC size, and AC meetings. The conclusions of this study can also apply to other developing countries that have similar contextual factors to those in Jordan, especially countries in the MENA region.

This study offers several areas that can be considered for future research. First, future research can look beyond basic gender diversity and consider other female attributes, such as the level of education, multiple directorships, and nationality. Second, as the dominant focus of some literature is on gender diversity, it is important to consider the impact of other types of AC diversity on audit quality, such as racial diversity, cultural diversity, religious diversity, and age diversity. Third, future studies could extend the boundary of AC experience to include AC members who worked previously as internal or external auditors, worked previously as CEOs, or have a financial market experience.

Fourth, given that all women included in this study are non-independent directors, as they are related to the controlling families, future studies can consider a comparison between

independent and non-independent female directors in terms of their impact on audit quality. Fifth, other different research approaches, such as self-administrated questionnaires, interviews, or focus groups would likely prove useful in obtaining more insights regarding the role of AC in ensuring high audit quality. For example, future research may consider exploring the behavior of the women inside the board (or AC) through other research approaches. Sixth, given that audit effort and audit fees are highly correlated, using actual audit hours spent in the auditing process, where possible, could be a better indicator of audit effort, by analyzing timesheets of auditors and finding out the time spent for each audit assignment. Finally, the scope of this study is non-financial listed firms on the ASE. Non-listed firms represent over 90% of all firms in Jordan. Given the importance of these businesses to the national economy, a new corporate governance code was enacted in 2013 for this type of firm. Future research can take into consideration non-listed firms, such as private limited companies and other types of medium and small entities.

### **Acknowledgments**

We gratefully acknowledge helpful comments and support received from the Editor-in-Chief (Robert Larson) and the two anonymous reviewers. We also appreciate the feedback made by the participants of the British Accounting and Finance Association conference (London, 2018).

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Table 1: Sample determination and description

| <b>Panel A: Sample determination</b>                   |                              | <i>Numbers</i>          |                        |
|--|------------------------------|-------------------------|------------------------|
| Listed non-financial companies in ASE as of 12/31/2017 |                              | 177                     |                        |
| Missing data   |                              | (62)                    |                        |
| Final sample   |                              | 115                     |                        |
| <b>Panel B: Sectors in Jordan as classified by ASE</b> |                              | <i>Total population</i> | <i>Sample included</i> |
| -  | Financial sector             | excluded                | excluded               |
| -  | Manufacturing sector         | 64                      | 43                     |
| -  | Services sector              | <u>113</u>              | <u>72</u>              |
| Total  |                              | 177                     | 115                    |
| <b>Panel C: Detailed classification of sectors</b>     |                              | <i>Total population</i> | <i>Sample included</i> |
| <u>Services sector</u>                                 |                              |                         |                        |
| -  | Health care                  | 4                       | 3                      |
| -  | Education                    | 6                       | 4                      |
| -  | Hotel and tourism            | 11                      | 8                      |
| -  | Transport                    | 11                      | 5                      |
| -  | Communication                | 1                       | 1                      |
| -  | Media                        | 2                       | 1                      |
| -  | Utilities                    | 3                       | 2                      |
| -  | Commercial services          | <u>75</u>               | <u>48</u>              |
| Total for service firms                                |                              | 113                     | 72                     |
| <u>Industrial sector</u>                               |                              |                         |                        |
| -  | Pharmaceutical               | 6                       | 6                      |
| -  | Chemical                     | 10                      | 7                      |
| -  | Paper and printing           | 4                       | 2                      |
| -  | Food and beverage            | 10                      | 7                      |
| -  | Tobacco                      | 2                       | 2                      |
| -  | Mining                       | 14                      | 10                     |
| -  | Engineering and construction | 7                       | 4                      |
| -  | Electric industries          | 5                       | 3                      |
| -  | Textile and leather          | <u>6</u>                | <u>2</u>               |
| Total for industrial firms                             |                              | 64                      | 43                     |

Table 2: Study models and variable definitions

|   |   |               |
|---|---|---------------|
| <p><b>A: Audit fees model</b><br/> <math>\ln\_FEES_{it} = \beta_0 + \beta_1 AC\_INDUSTRY_{it} + \beta_2 AC\_LEGAL_{it} + \beta_3 AC\_GEND_{it} + \beta_4 AC\_INDEP_{it} + \beta_5 AC\_FINANCIAL_{it} + \beta_6 AC\_SIZE_{it} + \beta_7 AC\_MEETINGS_{it} + \beta_8 \ln FIRM\_SIZE_{it} + \beta_9 BIG4_{it} + \beta_{10} NUMSUBS_{it} + \beta_{11} LEV_{it} + \beta_{12} ROA_{it} + \beta_{13} RISK + \beta_{14} LOSS + \beta_{15} NAS_{it} + \beta_{16} INDUSTRY + e</math></p>                               |   | Expected sign |
| <p><b>B: Big-4 audit firms model</b><br/> <math>BIG4_{it} = \beta_0 + \beta_1 AC\_INDUSTRY_{it} + \beta_2 AC\_LEGAL_{it} + \beta_3 AC\_GEND_{it} + \beta_4 AC\_INDEP_{it} + \beta_5 AC\_FINANCIAL_{it} + \beta_6 AC\_SIZE_{it} + \beta_7 AC\_MEETINGS_{it} + \beta_8 \ln FIRM\_SIZE_{it} + \beta_9 NUMSUBS_{it} + \beta_{10} LEV_{it} + \beta_{11} ROA_{it} + \beta_{12} RISK + \beta_{13} LOSS + \beta_{14} NAS_{it} + \beta_{15} INDUSTRY + e</math></p> <p>The model variables are defined as follows:</p> |   |               |
| lnFEES  | Total amount paid to auditors as fees of statutory auditing USD (converted to natural log).   |               |
| AC_INDUSTRY   | Proportion of audit committee (AC) industry experts to total AC members. AC industry expert is defined as a member who is/was employed by another firm that has the same business nature as the firm in which s/he now serves as an AC member.  | ?             |
| AC_LEGAL  | Proportion of AC members who have legal expertise to total members. Legal experts are directors with law degrees or with experience working in law-related positions (for example, lawyers and general counsels)  | ?             |
| AC_GEND   | Proportion of female members to total AC members  | ?             |
| AC_INDEP  | Proportion of independent members to total members  | +             |
| AC_FINANCIAL  | Proportion of members who have financial expertise to total members. Directors are designated as accounting financial experts if they possess CFA/CPA certification or have experience as auditors, chief financial (accounting) officers/controllers or in other finance/accounting related positions. | +             |
| AC_SIZE   | Number of AC members  | +             |
| AC_MEET   | Frequency of AC meetings during a year  | +             |
| LEV   | Debt as a percentage of total assets.   | +             |
| NUMSUBS   | Number of subsidiaries  | +             |
| LOSS  | Dummy variable equal to 1 if a company reported a loss in last two years, 0 otherwise.  | +             |
| RISK  | Percentage of current assets to total assets.   | +             |
| ROA   | Net profit as a percentage of total assets (an indication of profitability).  | -             |
| BIG4  | Dummy variable equal to 1 if the company audited by one of Big4 (Big 4 affiliates) audit firms, 0 otherwise.  | +             |
| lnFIRM_SIZE   | Natural log of total assets   | +             |
| NAS   | Dummy variable equal to 1 if the audit firm provides non-audit service jointly with the obligatory audit work, 0 otherwise.   | -             |
| INDUSTRY  | Dummy variable equal to 1 if manufacturing firm and 0 if services firm  | ?             |

Table 3 Panel A: Descriptive statistics for continuous variables

| Year  | Descriptive Statistics | FEES \$  | AC_INDUSTRY | AC_LEGAL | AC_GEND | AC_INDEP | AC_FINANCIAL | AC_MEET | AC_SIZE | FIRM SIZE (000) | LEV  | NUMSUBS | RISK  | ROA   |
|-------|------------------------|----------|-------------|----------|---------|----------|--------------|---------|---------|-----------------|------|---------|-------|-------|
| 2009  | Mean                   | 13,660.0 | 0.24        | 0.09     | 0.03    | 0.65     | 0.59         | 3.66    | 3.09    | 68,147          | 0.07 | 1.26    | 0.45  | 0.02  |
|       | Min                    | 1,865.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 2.00    | 3.00    | 2,448           | 0.00 | 0.00    | 0.00  | -0.42 |
|       | Max                    | 110,900  | 1.00        | 0.67     | 0.29    | 1.00     | 1.00         | 7.00    | 4.00    | 885,699         | 0.77 | 16.0    | 0.99  | 0.80  |
| 2010  | Mean                   | 13,944.0 | 0.22        | 0.10     | .034    | 0.64     | 0.59         | 3.80    | 3.10    | 69,368          | 0.08 | 1.30    | 0.44  | 0.00  |
|       | Min                    | 2,000.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 2.00    | 3.00    | 2,142           | 0.00 | 0.00    | 0.00  | -0.51 |
|       | Max                    | 116,904  | 1.00        | 0.70     | 0.42    | 1.00     | 1.00         | 7.00    | 4.00    | 100,803         | 72.0 | 16.0    | 0.99  | 0.38  |
| 2011  | Mean                   | 14,262.0 | 0.24        | 0.09     | 0.03    | 0.63     | 0.59         | 3.88    | 3.00    | 77,944          | 0.08 | 1.39    | 0.42  | 0.00  |
|       | Min                    | 2,000.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 0.00    | 3.00    | 1,917           | 0.00 | 0.00    | 0.00  | -0.3  |
|       | Max                    | 131,818  | 1.00        | 0.80     | 0.40    | 1.00     | 1.00         | 17.0    | 4.00    | 130,216         | 0.61 | 21.0    | 0.97  | 0.31  |
| 2012  | Mean                   | 14,942.0 | 0.24        | 0.11     | 0.033   | 0.63     | 0.58         | 3.90    | 3.00    | 80,007          | 0.08 | 1.30    | 0.43  | 0.00  |
|       | Min                    | 2,000.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 1.00    | 3.00    | 1,920           | 0.00 | 0.00    | 0.00  | -0.46 |
|       | Max                    | 119,818  | 1.00        | 0.75     | 0.40    | 1.00     | 1.00         | 8.00    | 5.00    | 153,488         | 0.61 | 21.0    | 0.96  | 0.29  |
| 2013  | Mean                   | 15,178.0 | 0.27        | 0.11     | 0.03    | 0.64     | 0.59         | 3.82    | 3.11    | 85,788          | 0.08 | 1.36    | 0.41  | 0.02  |
|       | Min                    | 1,392.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 0.00    | 3.00    | 1,887           | 0.00 | 0.00    | -0.19 | -0.27 |
|       | Max                    | 128,818  | 1.00        | 0.60     | 0.4     | 1.00     | 1.00         | 9.00    | 5.00    | 179,863         | 0.67 | 20.0    | 0.96  | 0.28  |
| 2014  | Mean                   | 15,351.0 | 0.27        | 0.13     | 0.03    | 0.65     | 0.59         | 3.80    | 3.00    | 84,961          | 0.08 | 1.30    | 0.43  | 0.01  |
|       | Min                    | 1,392.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 0.00    | 3.00    | 1,692           | 0.00 | 0.00    | -0.29 | -0.35 |
|       | Max                    | 142,297  | 1.00        | 0.80     | 0.40    | 1.00     | 1.00         | 10.0    | 5.00    | 176,578         | 0.95 | 20.0    | 0.97  | 0.31  |
| 2015  | Mean                   | 15,402.0 | 0.25        | 0.13     | 0.03    | 0.64     | 0.59         | 3.80    | 3.00    | 85,221          | 0.08 | 1.29    | 0.42  | 0.02  |
|       | Min                    | 2,000.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 0.00    | 3.00    | 1,820           | 0.00 | 0.00    | -0.07 | -0.30 |
|       | Max                    | 146,600  | 1.00        | 1.00     | 0.40    | 1.00     | 1.00         | 8.00    | 5.00    | 176,840         | 0.82 | 20.0    | 0.95  | 0.32  |
| 2016  | Mean                   | 15,490.0 | 0.27        | 0.13     | 0.04    | 0.64     | 0.60         | 3.90    | 3.08    | 85,945          | 0.08 | 1.30    | 0.42  | 0.01  |
|       | Min                    | 2,000.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 0.00    | 3.00    | 1,900           | 0.00 | 0.00    | -0.01 | -0.42 |
|       | Max                    | 147,000  | 0.80        | 0.67     | 0.45    | 1.00     | 1.00         | 10.0    | 5.00    | 179,200         | 0.84 | 20.0    | 0.95  | 0.36  |
| 2017  | Mean                   | 15,630.0 | 0.25        | 0.12     | 0.04    | 0.61     | 0.57         | 3.82    | 3.15    | 86,243          | 0.09 | 1.30    | 0.39  | 0.01  |
|       | Min                    | 2,000.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 0.00    | 3.00    | 1,900           | 0.00 | 0.00    | -0.01 | -0.42 |
|       | Max                    | 148,200  | 0.80        | 0.67     | 0.45    | 1.00     | 1.00         | 7.00    | 5.00    | 181,400         | 0.83 | 20.0    | 0.95  | 0.36  |
| Total | Mean                   | 14,744.0 | 0.22        | 11.0     | 0.03    | 0.63     | 0.58         | 3.60    | 3.11    | 79,773          | 0.08 | 1.30    | 0.41  | 0.01  |
|       | Min                    | 1,392.00 | 0.00        | 0.00     | 0.00    | 0.00     | 0.00         | 0.00    | 3.00    | 1,692           | 0.00 | 0.00    | -0.29 | -0.51 |
|       | Max                    | 147,000  | 1.00        | 1.00     | 0.42    | 1.00     | 1.00         | 17.0    | 5.00    | 179,863         | 0.95 | 21.0    | 0.99  | 0.80  |

Note: Please refer to Table 2 for variable definitions.

Table 3, Panel B: Descriptive statistics for dichotomous variables

| Year    | Yes/No (%)       | LOSS    | BIG4    | INDUSTRY | NONAUDIT_FEES |
|---------|------------------|---------|---------|----------|---------------|
| 2009    | Yes (Percentage) | 43 (37) | 40 (35) | 42 (36)  | 12 (10)       |
|         | No (Percentage)  | 72 (63) | 75 (65) | 73 (64)  | 103 (90)      |
| 2010    | Yes (Percentage) | 53 (46) | 42 (37) | 42 (36)  | 12 (10)       |
|         | No (Percentage)  | 62 (54) | 73 (63) | 73 (64)  | 103 (90)      |
| 2011    | Yes (Percentage) | 51 (44) | 44 (38) | 42 (36)  | 11 (10)       |
|         | No (Percentage)  | 64(56)  | 71 (62) | 73 (64)  | 104 (90)      |
| 2012    | Yes (Percentage) | 64 (56) | 44 (38) | 42 (36)  | 12 (10)       |
|         | No (Percentage)  | 51 (44) | 71 (62) | 73 (64)  | 103(90)       |
| 2013    | Yes (Percentage) | 60 (52) | 43 (37) | 42 (36)  | 12 (10)       |
|         | No (Percentage)  | 55 (48) | 72 (63) | 73 (64)  | 103 (90)      |
| 2014    | Yes (Percentage) | 47 (41) | 45 (39) | 42 (36)  | 12 (10)       |
|         | No (Percentage)  | 68 (59) | 70 (61) | 73 (64)  | 103 (90)      |
| 2015    | Yes (Percentage) | 46 (40) | 44 (38) | 42 (36)  | 12 (10)       |
|         | No (Percentage)  | 69 (60) | 71 (62) | 73 (64)  | 103 (90)      |
| 2016    | Yes (Percentage) | 52 (45) | 44 (38) | 42 (36)  | 12 (10)       |
|         | No (Percentage)  | 63 (55) | 71 (62) | 73 (64)  | 103 (90)      |
| 2017    | Yes (Percentage) | 49 (43) | 44 (38) | 42 (36)  | 12 (10)       |
|         | No (Percentage)  | 72 (57) | 71 (62) | 73 (64)  | 103 (90)      |
| Average | Yes (Percentage) | 52 (45) | 43 (37) | 42 (36)  | 12 (10)       |
|         | No (Percentage)  | 63 (55) | 72 (63) | 73 (64)  | 103 (90)      |

Note: Please refer to Table 2 variable definitions.

Table 4: Spearman correlation matrix

| Variables        | 1      | 2       | 3       | 4       | 5      | 6       | 7      | 8      | 9       | 10     | 11     | 12     | 13      | 14     | 15    | 16   | 17   | VIF  |
|------------------|--------|---------|---------|---------|--------|---------|--------|--------|---------|--------|--------|--------|---------|--------|-------|------|------|------|
| (1) ln_FEES      | 1.00   |         |         |         |        |         |        |        |         |        |        |        |         |        |       |      |      |      |
| (2) AC_INDUSTRY  | 0.193  | 1.00    |         |         |        |         |        |        |         |        |        |        |         |        |       |      |      | 1.52 |
| (3) AC_LEGAL     | 0.15   | 0.09*   | 1.00    |         |        |         |        |        |         |        |        |        |         |        |       |      |      | 1.62 |
| (4) AC_GEND      | 0.18   | 0.21    | -0.017* | 1.00    |        |         |        |        |         |        |        |        |         |        |       |      |      | 1.29 |
| (5) AC_INDEP     | 0.27*  | 0.18*   | 0.09    | 0.03    | 1.00   |         |        |        |         |        |        |        |         |        |       |      |      | 2.88 |
| (6) AC_FINANCIAL | 0.242  | 0.175*  | -0.142  | -.122*  | 0.12*  | 1.00    |        |        |         |        |        |        |         |        |       |      |      | 1.30 |
| (7) AC_SIZE      | 0.246  | -0.113  | 0.248   | 0.049   | 0.232  | 0.09    | 1.00   |        |         |        |        |        |         |        |       |      |      | 1.45 |
| (8) AC_MEET      | 0.11   | 0.19*   | 0.240*  | -0.15   | -0.07  | 0.117*  | -0.002 | 1.00   |         |        |        |        |         |        |       |      |      | 1.37 |
| (09) ln_SIZE     | 0.663  | -0.052  | 0.040   | 0.14*   | 0.36   | 0.190   | 0.13   | 0.02   | 1.00    |        |        |        |         |        |       |      |      | 2.31 |
| (10) LEV         | 0.222  | -0.145* | 0.052*  | 0.003*  | 0.061  | 0.124   | 0.323  | 0.17*  | -0.06   | 1.00   |        |        |         |        |       |      |      | 1.40 |
| (11) NUMSUBS     | 0.461* | -0.052  | 0.162   | 0.228   | 0.007  | 0.117*  | 0.313  | 0.124  | -0.02   | 0.06*  | 1.00   |        |         |        |       |      |      | 1.35 |
| (12) LOSS        | 0.026  | -0.090  | 0.140*  | 0.115   | -0.143 | -0.229  | -0.165 | 0.117  | 0.165   | 0.12   | 0.08   | 1.00   |         |        |       |      |      | 1.41 |
| (13) RISK        | -0.05  | -0.226  | -0.005  | -0.065* | 0.005  | -0.01   | -0.096 | -0.229 | -0.222  | -0.199 | 0.162  | 0.23*  | 1.00    |        |       |      |      | 1.35 |
| (14) ROA         | 0.012  | 0.162*  | -0.109* | -0.032  | 0.176  | 0.149*  | 0.24*  | -0.105 | -0.079  | -0.43* | 0.122* | -0.15  | 0.016   | 1.00   |       |      |      | 1.48 |
| (15) BIG4        | 0.484  | 0.083   | 0.097   | 0.163*  | 0.177  | -0.065* | 0.331  | 0.109  | 0.090   | -0.024 | -0.031 | 0.022* | 0.01    | 0.18   | 1.00  |      |      | 1.55 |
| (16) NAS         | -0.03  | -0.063  | 0.083   | -0.096* | 0.060  | 0.081   | -0.004 | -0.065 | -0.03*2 | 0.038* | -0.009 | -0.010 | -0.054  | -0.09  | -0.12 | 1.00 |      | 1.14 |
| (17) INDUSTRY    | -0.06  | -0.101* | -0.269  | -0.061  | 0.084  | -0.12   | -0.106 | -0.090 | -0.204  | -0.116 | 0.193  | 0.025  | -0.076* | 0.149* | 0.11  | 0.08 | 1.00 | 1.40 |

Notes: Please refer to Table 2 for variable definitions. \* Indicates the correlations is significant at level 5%

Table 5: Regression of the effect of audit committee characteristics and control variables on audit quality (measured by *ln*-audit fees)

| Variables              | Column1: Random-Effect Regression |         | Column2: Fixed-effects regression |         | Column3: Robust standard error regression (Huber-White's S. estimator) |         |
|------------------------|-----------------------------------|---------|-----------------------------------|---------|--|---------|
|                        | Coefficient                       | z value | Coefficient                       | t value | Coefficient  | z value |
| AC_INDUSTRY            | 0.25                              | 2.80*** | 0.19                              | 2.08**  | 0.25   | 2.39**  |
| AC_LEGAL               | 0.18                              | 1.32    | 0.16                              | 1.09    | 0.18   | 1.05    |
| AC_GEND                | 0.09                              | -1.49   | 0.05                              | 1.54    | 0.09   | -1.15   |
| AC_INDEP               | 0.38                              | 4.27*** | 0.44                              | 4.34*** | 0.38   | 2.65*** |
| AC_FINANCIAL           | 0.24                              | 2.88*** | 0.25                              | 2.42**  | 0.24   | 2.92**  |
| AC_SIZE                | 0.13                              | 1.75*   | 0.02                              | 0.32    | 0.13   | 1.60*   |
| AC_MEET                | -0.01                             | -0.72   | -0.04                             | -0.40   | -0.01  | -0.57   |
| LnSIZE                 | 0.19                              | 6.22*** | 0.11                              | 4.32*** | 0.19   | 3.13*** |
| LEV                    | 0.12                              | 0.72    | 0.02                              | 0.44    | 0.12   | 0.34    |
| NUMSUBS                | 0.09                              | 6.55*** | 0.09                              | 3.05*** | 0.09   | 3.68*** |
| LOSS                   | -0.23                             | -1.02   | -0.12                             | -1.69*  | -0.23  | -1.74   |
| RISK                   | -0.02                             | -0.70   | -0.09                             | -0.82   | -0.02  | -0.45   |
| ROA                    | -0.27                             | -2.44** | -0.15                             | -1.88** | -0.27  | -1.42   |
| BIG4                   | 0.31                              | 3.90*** | 0.19                              | 5.40*** | 0.31   | 2.40*** |
| INDUSTRY               | 0.10                              | 1.09    | -                                 | -       | 0.10   | 0.70    |
| NAS                    | -0.13                             | -0.75   | -0.03                             | -0.14   | -0.13  | -0.90   |
| Intercept              | 3.90                              | 9.22*** | 4.06                              | 9.88*** | 3.90   | 6.19*** |
| R-square               | 0.72                              |         | 0.45                              |         | 0.72   |         |
| F statistics (p-value) | 422.11***                         |         | 6.04***                           |         | 422.11***  |         |

Notes: Please refer to Table 2 for variable definitions. \*Sig. at level 10%, \*\*sig. at level 5%, \*\*\*sig. at level 1%.

Table 6: Binary probit regression of audit committees' characteristics and different control variables on audit quality (using Big-4 model)

| Variables              | Coefficient | z value |
|------------------------|-------------|---------|
| AC_INDUSTRY            | 1.63        | 1.88*   |
| AC_LEGAL               | -0.09       | -0.11   |
| AC_GEND                | 0.15        | 1.28    |
| AC_INDEP               | 2.32        | 2.91**  |
| AC_FINANCIAL           | 1.02        | 1.66*   |
| AC_SIZE                | 2.08        | 0.85    |
| AC_MEET                | 2.03        | 1.07    |
| LnSIZE                 | 2.73        | 1.85*   |
| LEV                    | -0.18       | -1.05   |
| NUMSUBS                | 0.48        | 1.65*   |
| LOSS                   | -3.11       | -1.59   |
| RISK                   | 0.81        | 1.33    |
| ROA                    | 2.73        | 1.55    |
| INDUSTRY               | -5.32       | -1.60   |
| NAS                    | -0.48       | -0.19   |
| Intercept              | -12.8       | -0.36   |
| R-square               | 0.52        |         |
| F statistics (p-value) | 132.79***   |         |

Notes: Please refer to Table 2 for variable definitions. \*Sig. at level 10%, \*\* sig. at level 5%, \*\*\*sig. at level 1%.