Female directors on audit committees and audit quality: Evidence from the UK

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Abstract

Evidence on the association between female directors on audit committees and audit quality is not convincing, as it fails to effectively consider the practitioners' audit quality assessments. By utilising both the audit fees and meeting or beating the zero earnings benchmark as audit quality proxies, this study captures the practitioners' evaluations and provides convincing evidence on the link between female directors on audit committees and audit quality.

Further, prior literature fails to consider the types of female financial experts on audit committees in the context of audit quality. It is also unclear whether Chief Financial Officer (CFO) experts on audit committees are as effective as public accounting experts in monitoring financial reports. Therefore, this thesis also investigates whether accounting, non-accounting, public accounting and CFO expertise of female audit committee members are associated with audit quality.

Using ordinary least-squares regression and the United Kingdom firms from 2009 to 2017, this study finds a positive association between female directors on audit committees and audit quality. Further, it substantiates that this association is dependent on the public accounting expertise of female audit committee members.

This study contributes to audit quality literature and to the research identifying characteristics driving female directors' monitoring. Moreover, it contributes to the conflicting evidence related to female financial experts on audit committees and financial reporting monitoring, as the results suggest that the mixed evidence may have been driven by the researchers' failure to segregate financial expertise. It also contributes to the debate on whether accounting or non-accounting expertise enhances financial reporting monitoring. Further, it applies the theoretical framework of combining agency theory and resource dependency theory to female directors on audit committees. Furthermore, the study supports policy-makers' efforts towards greater presence of female directors, however, it recommends that they should also consider the public accounting expertise of female directors.

Chapter 1: Introduction

1.0 Introduction

This chapter introduces the thesis. Section one details the history of the audit committee. Section two explains the role and importance of the audit committee. Section three discusses the importance of audit quality and its measures. Section four presents the steps of the regulators favouring the representation of female directors and describes their link with audit quality. Section five provides the motivation for conducting this study while section six outlines the contributions of this thesis. The last section presents the structure of this thesis.

1.1 History of the audit committee

In the United States (US), the history of the audit committee can be traced back to the late 1930s, when the fraudulent financial reporting by McKesson and Robins Inc. led the New York Stock Exchange (NYSE) and Securities Exchange Commission (SEC) to suggest that a special committee consisting of non-officer members of the board should select an external auditor and also prepare the terms of engagement with the auditor (Fichtner, 2010; Ghafran, 2013). This suggests that, at the time, there was a need for additional protection for the investors due to the failure of the external auditors to detect the fictitious assets recognised in the financial statements of McKesson and Robins Inc. (DeZoort, 1997; Fichtner, 2010).

Audit committees received greater attention in the 1960s and 1970s, when there were considerable demands for more accountability of directors, leading the SEC to require firms to form an audit committee and also to disclose the presence, composition and function of the audit committee (DeZoort, 1997). Moreover, the National Commission on Fraudulent Financial Reporting (the Treadway Commission) also, in late 1980s, recommended the formation of an audit committee consisting of independent directors and also emphasised the role of the audit committee in enhancing the reliability of financial reporting (Pandit, Conway,

& Baker, 2017). Similarly, in the late 1990s, the Blue Ribbon Committee, specifically focussing on audit committees (Pandit et al., 2017) pointed out that audit committees play an important role in maintaining the integrity of financial reporting and also provided recommendations on "improving their competence, ensuring their independence and extending their oversight" (Spira, 2006, p.184).

Corporate scandals such as Enron and WorldCom in the early 2000s developed doubts about the integrity of financial reports in the US, as investigations discovered that financial frauds were concealed through poor accounting policies, which led to the Sarbanes-Oxley Act in 2002, where further audit committee regulations were devised in order to restore trust in the reliability of financial reports (Fichtner, 2010; Ghafran, 2013).

In the context of the United Kingdom (UK), before 1975 there were very few firms that had an audit committee and this may have been because of lower representation of non-executive directors (NEDs) (required for constituting an audit committee) in the UK (Collier, 1996). In 1987, the Bank of England, the Confederation of Business Industry and other financial institutions recommended firms to adopt audit committees given the increasing number of corporate frauds (Vanasco, 1994). Further, in 1988, Tom Smith in the House of Lords stated that "government and regulatory bodies are keen that the trend towards audit committees shall continue. Eventually, new rules on audit committees will become law – hopefully before great companies crash and investors lose out" (Vanasco, 1994, p. 24).

The Cadbury Committee in 1992 helped raise the number of firms forming audit committees, as almost all listed firms in the UK formed an audit committee in the following three years (Ghafran, 2013). It recommended the formation of an audit committee consisting of NEDs (the majority of whom should be independent from the company) and stated that the "audit committee enables a board to delegate to a subcommittee a thorough and detailed review of

audit matters, it enables the NEDs to contribute an independent judgment and play a positive role in an area for which they are particularly fitted, and it offers the auditors a direct link with the non-executive directors" (Cadbury Committee, 1992, para. 4.36). The Cadbury Committee was formed after scandals such as Polly Peck, Maxwell Group and BCCI, which led to the suggestion that the auditors were closely associated with management and thus less likely to question the accounting practices of the management (Walker, 2004). Before BCCI collapsed, it published its annual UK accounts without any qualifications and thus the investors were completely unaware of the impending bankruptcy of the firm (Boyd, 1996). The Cadbury Committee helped firms realise the critical role of NEDs (Vanasco, 1994) and also concentrated on the audit committee's role of negotiating with the firm's external auditor and overseeing financial reports before publication (Walker, 2004). Following the Enron scandal, the Smith Committee was constituted in 2003, which strengthened audit committees in a way similar to the SOX (Sarbanes-Oxley Act) in the US, as it provided recommendations for enhancing the effectiveness of audit committees (Ghafran, 2013).

The UK Corporate Governance Code requires listed firms to constitute an audit committee consisting of independent directors (Financial Reporting Council (FRC), 2018). However, the current regulatory regime follows a principle-based approach, where it is not compulsory for the listed firms to follow the requirements in the Code, however, the firms will have to disclose the reasons for diverting from the Code's requirements (Ghafran & O'Sullivan, 2017). This approach is in contrast to the one adopted in the US in which it is mandatory for the listed firm to follow SOX and thus it is compulsory to form a fully independent audit committee (Fauver, Hung, Li, & Taboada, 2017). After the SOX in 2002, only a few of the world's largest capital markets required firms to form an audit committee; however, in the following seven years, several of these economies devised laws requiring listed firms to establish an audit committee (Fichtner, 2010).

1.2 Role and importance of audit committee

"Audit committee is the single most important board sub-committee owing to its specific role of protecting the interest of shareholders in relation to financial oversight and control" (Aldamen, Duncan, Kelly, McNamara & Nagel, 2012, p. 972). SOX (2002, p. 747) defines an audit committee as "a committee (or equivalent body) established by and amongst the board of directors of an issuer for the purpose of overseeing the accounting and financial reporting processes of the issuer and audits of the financial statements of the issuer".

According to the Smith Committee (2003), an audit committee is responsible for the following roles: reviewing the reliability of the financial reports; monitoring the appropriateness of disclosures made in the financial reports; in the case of unsatisfactory aspects in financial statements, disclosing these views to the board; monitoring the acceptability of internal financial controls; monitoring the arrangements in place for the employees to anonymously disclose any wrongful practices related to financial reports; assessing the procedures undertaken by the internal audit function; reviewing the association of the firm with the auditor (this includes recommending their appointment or termination to the board, approving the fees for the audit, reviewing the engagement terms, evaluating their independence, objectivity and effectiveness, assessing the plan in effect at the beginning of the audit, and also considering if the audit conducted is appropriate).

The Cadbury Committee (1992) points out the importance of audit committees and states that they "strengthen the position of the external auditor, by providing a channel of communication and forum for issues of concern" (para. 5. 28), provide a platform where the auditor can demonstrate independence in the case of disagreement with the management, enable an independent environment for the internal auditor and thus cause a stronger internal audit function and enhance the confidence of the public in the reliability of financial statements. Survey evidence in Sulaiman (2017) suggests that audit committees conduct informal meetings

(apart from the formal meetings) with the auditors, which builds trust and thus enables more in-depth discussion, ask auditors to perform additional work, and provide additional information pertaining to specific issues. The regulatory body of audit firms, Public Companies Accounting Oversight Board (PCAOB), also considers the audit committee to be an important mechanism in performing the role of overseeing the audits of public companies (Hanson, 2014). Moreover, an effective audit committee may interact more with the external auditors in relation to major accountancy issues and may also ensure that the resources devoted to the audit are sufficient and appropriate (Sulaiman, 2017). As a result, an audit committee is likely to influence the quality of the audit executed by the firm's external auditor, suggesting the link between audit committee mechanisms and audit quality.

1.3 Audit quality

A higher quality of audit is vital for the reliability of financial reports and therefore safeguards the economic interests of the firm's shareholders and other stakeholders by having a positive influence on the value of the financial reports prepared by the management (Sulaiman, 2017). Moreover, auditing is likely to be especially important in the current environment given the increasing complexity involved in business transactions and accountancy (DeFond & Zhang, 2014). Also, the establishment of regulatory bodies focusing on the public accounting profession (DeFond & Zhang, 2014) is a further indication of the vital nature of audit quality. FRC (the regulatory body of auditors in the UK) contends that major audit firms have failed to meet their audit quality targets (Jones, 2019). Further, the corporate failure of Carrilion has resulted in heavy criticism of auditors, leading the regulators to analyse strategies to enhance audit quality (Doherty, 2018). Appendix A details the recent instances where the auditors' work has been called into question. These corporate scandals have intensified the scrutiny on auditing and has led regulators to question the audit function and to assess whether it is adhering to the expectations of society (Trentmann, 2019).

DeAngelo (1981, p. 186) defines audit quality as "the market-assessed joint probability that a given auditor will *both* (a) detect a breach in the client's accounting system, and (b) report the breach". The first part of this definition relates to the competence of the auditor and the extent of effort exerted by the auditor while the second part concerns with the auditor's objectivity (Knechel, Krishnan, Pevzner, Shefchik, & Velury, 2013). However, Knechel et al. (2013) contend that this specific definition of audit quality entails the following two problems: a) it does not resonate with the audit-risk model, which guides the audit and depicts the auditor's perspective and b) the market perceptions could be erroneous.

Recent research by DeFond and Zhang (2014, p. 276) considers audit quality as "greater assurance that the financial statements faithfully reflect the firm's underlying economics, conditioned on its financial reporting system and innate characteristics". Another recent study by Gaynor, Kelton, Mercer, & Yohn (2016), however, contends that higher audit quality entails providing greater assurance that the auditor collected sufficient and appropriate evidence in order to ensure the financial statements reflect the firm's true performance. These multiple definitions suggest that it is difficult for academics to define audit quality (Gaynor et al., 2016; Laitinen & Laitinen, 2015), as there is no universally acceptable definition of audit quality (Knechel et al., 2013).

As a result, prior researchers have utilised various measures to ascertain audit quality (Gaynor et al., 2016). DeFond and Zhang (2014) categorise the audit quality proxies into input-based and output-based proxies in their qualitative review of audit quality. They argue that input-based measures determine audit quality by utilising the "observable inputs to the audit process", such as auditor-client contracting environment and auditor size (p. 289), while output-based proxies consider "the level of audit quality actually delivered" and thereby focus on the outputs of the audit process, such as financial reporting quality, audit opinion and material misstatements (p. 283).

Audit quality proxies utilised by prior researchers, in effect, attempt to determine the extent of competency, effort and independence depicted by the auditor, as any poor competency or effort shows the inability of the auditor to identify financial statement issues, while a lower independence level inhibits the auditor in revealing problems in the financial statements (Aobdia, 2019; Bell, Causholli, & Knechel, 2015). However, Aobdia (2019) argues that these constructs cannot be captured directly given the lack of data available to the public and thus the academics have to be content with using indirect proxies of audit quality by measuring the inputs and outputs of the audit. Similarly, Bell et al. (2015) contend that audit quality proxies used by prior researchers are derived from unobservable audit processes, therefore, these measures are indirect and thus may not fully depict the quality of the audit.

The aforementioned discussion suggests the importance of deriving audit quality from the audit evaluations of regulators and audit firms, as these practitioners possess detailed information about the auditing process (Aobdia, 2019; Bell et al., 2015) and therefore they are directly (and thus more effectively) able to capture the competency, effort and independence level of the auditor (Bell et al., 2015) by assessing whether the evidence gathered during the audit supports the audit opinion and by analysing the level of compliance of the auditor's work with auditing standards (Bell et al., 2015; PCAOB, 2014). Therefore, Aobdia (2019) recommends considering those audit quality proxies that are associated with the practitioners' assessment of audit quality.

PCAOB (2011) contends that "abnormal accruals do not appear to be a good measure of audit quality. Specifically, PCAOB staff have found no direct statistical relationship between the size of an abnormal accrual and the probability that inspections staff would detect an audit failure" (p. 37), which raises concerns, as prior researchers have utilised abnormal accruals as an audit quality proxy. This conflict is also put forward by Bell et al. (2015), who argue that the practitioners may consider the audit process to be of high quality even if the academics'

proxies may suggest low audit quality. This indicates the importance of taking into account the practitioners' view of audit quality by adopting those audit quality measures that have been examined to be associated with the practitioners' assessment of audit quality.

Aobdia (2019) offers important insights in this regard. He identifies the audit quality proxies utilised by researchers and then empirically examines which of these measures are associated with the practitioners' evaluation of audit quality. He utilises both PCAOB and audit firms' internal inspections as practitioners, as he argues that PCAOB inspections are not a perfect measure to capture audit quality and thus also adopts audit firms' internal inspections in order to attenuate the circumstances in which PCAOB inspections may be ineffective in capturing audit quality (Appendix B explains the weaknesses of audit quality assessments through PCAOB inspections and also describes how internal inspections of audit firms could mitigate those weaknesses). Therefore, he contends that adopting the audit quality proxies that are associated with both PCAOB inspections and audit firms' internal reviews is a more appropriate methodology.

Aobdia (2019) finds that accounting restatements, audit fees and meeting or beating the zero earnings benchmark are the only proxies that are associated with both PCAOB's audit assessment and audit firms' internal evaluation of the audit. Lai, Srinidhi, Gul, and Tsui (2017) contend that restatements are not directly under the control of audit committees and therefore it can be argued that audit fees and the propensity to meet or beat the zero earnings benchmark can be considered to be the most suitable audit quality proxies in the context of audit committees.

1.4 Female directors

Independent directors were regarded as the effective solution for the corporate scandals that rendered financial statements unreliable (Gull, 2018). Independent directors reflect no family

links with the management and also have no financial links with the firm and thereby are likely to be free from the management pressure, which enables them to question managers (Adams, 2016). However, board independence may be ineffective if the board mostly consists of directors who are part of the "Old-Boys Club" (Adams, 2016, p. 371), which may suggest that independent directors may be selected from a particular group of male directors and thus these independent directors will likely be friendlier with the management, thereby raising questions on their objectivity. This viewpoint is also supported by Derek Higgs who was tasked by the UK government to review the role of NEDs in response to the corporate scandals of the 2000s, as he suggested that boards should broaden the pool of potential NEDs from which the selection is to be made (Higgs, 2003). Such limited pool limits the monitoring of management. The corporate governance failure of Hollinger International Inc., where the Hollinger's CEO "bumped into" someone he knew beforehand in New York and then, on the invitation of the CEO, that individual joined Hollinger's audit committee as an independent director (Beasley, Carcello, Hermanson, & Neal, 2009, p. 68), suggests that friendly associations with the management is unlikely to result in effective monitoring even if the director is regarded as independent. The Paris Report (2004) investigating the failure of Hollinger contends that Hollinger's board was more like a social club than the board of a company. Therefore, as female directors are unlikely to form part of any male networks and thus more closely aligned with the principle of independent director (Adams, 2016; Adams & Ferreira, 2009), they may be more effective in monitoring management (Lai et al., 2017).

Female directors have attracted substantial attention from regulatory bodies around the world. Norway was the first country to implement female quotas, making it compulsory for firms to have 40% of the board represented by females (Terjesen & Sealy, 2016; Marquardt & Weidman, 2016; Terjesen, Aguilera, & Lorez, 2015). Since then, other countries have also followed the policy of mandating the presence of female directors, as between 2008 and 2015

there were 32 countries that implemented female quotas for listed or government firms (Adams, 2016; Terjesen, et al., 2015). Appendix C provides examples of female quota policy implemented by the countries and also explains the repercussions for non-compliance. The consequences for firms in the case of non-compliance include de-listing, non-payment of director fees, non-awarding of state contracts and making directors' appointments void (Terjesen & Sealy, 2016). Furthermore, Appendix D presents some of the initiatives concentrated on increasing the female directors.

Apart from the female quotas, there is another medium in which the regulators have made efforts to raise the number of female directors. This involves comply or explain corporate governance principle (Thams, Bendell, & Terjesen, 2018), where firms are required to disclose the establishment of gender-diversity objectives and their progress, while providing reasons for non-compliance (Marquardt & Weidman, 2016). However, there is still a threat of mandatory female quotas in these regimes if there is poor progress towards gender-diversity on boards, as the Secretary of State of the UK government states that the businesses should themselves attempt to focus on raising the number of female directors as opposed to having quotas being made compulsory for them (Terjesen & Sealy, 2016). Similarly, Sweden threatened to impose female quotas legislation if the firms do not increase the female directors' percentage voluntarily (Adams & Ferreira, 2009).

1.4.1 Female directors on audit committees and audit quality

Agency theory posits that there is a separation of ownership and control, which is likely to result in conflicts of interests between management and shareholders (Zalata, Tauringana, & Tingbani, 2018). These agency conflicts may result in managers' manipulation of financial reports for personal interests (Dhaliwal, Naiker, & Navissi, 2010). Given that audit committees are tasked with the responsibility to monitor financial reports (Aldamen, Hollindale, & Ziegelmayer, 2018), an effective audit committee may enhance monitoring and safeguard the

credibility of financial reports, and thereby reduce these agency costs (Dhaliwal et al., 2010). DeZoort, Hermanson, Archambeault, and Reed (2002) argue that audit committee effectiveness is influenced by how it is composed. Hence, the effectiveness of the audit committee relies on the quality of directors represented on it. As female directors are unlikely to be a part of any all-male networks (Zalata et al., 2018), they are likely to be more effective in monitoring (Lai et al., 2017). Further, keeping in view of the importance of audit committees as mentioned in section 1.4, the regulators' efforts to increase female directors also suggest that regulators expect female directors to act as better monitors. As a result, given that Bédard and Gendron (2010) contend that audit committee mechanisms' value is ascertained through audit quality, it is expected that female directors on audit committees are likely to be positively associated with audit committee effectiveness and thus audit quality.

1.5 Motivation

1.5.1 Female directors on audit committees

Despite the considerable efforts of the regulators to increase the representation of female directors, as mentioned in section 1.4, firms seem unsure about the effectiveness of female directors. Although there has been a surge in the participation of women in middle-management positions, there is still a lack of female representation in the positions of influence, such as serving on company boards (Ryan et al., 2016). This can be demonstrated by the presence of a number of firms in the FTSE 350 index that have no female directors (Neate, 2018; Rudgard, 2018). Similarly, McGregor (2018) points out that around a quarter of public companies in California have no female directors. This suggests that firms are slow to respond to the calls for greater numbers of females on the company boards (Main & Gregory-Smith, 2018; Neate, 2018; Seiersdat & Opsahl, 2011) and thus there is likely to be uncertainty

pertaining to the female directors' effectiveness (Hoobler, Masterson, Nkomo, & Michel, 2018).

Rosener (2011) argues that the pace of growth of female directors' presence is likely to be slow until corporate leaders realise that gender-diversity is beneficial for businesses rather than simply a social issue. In a similar vein, director of an executive search firm contends that there are firms that do not consider the presence of female directors to be valuable (Whitehead, 2017). Main and Gregory-Smith (2018) find that, under the comply or explain regime of the UK Corporate Governance Code where any director with over nine years of board service is considered to be non-independent, the firms are less likely to select the explain option (in which firms provide a justification for diverting from the Code's provisions) for female directors, who have been serving for more than nine years, in comparison to male directors with board service in excess of nine years and thus conclude that female directors are inducted for symbolic purposes to ease the government pressure to increase female representation on the boards. Similarly, Seiersdat and Opsahl (2011) find that firms have made no further increase in the share of female directors after having abided by the legislation pertaining to female director quota in Norway and thereby they conclude that firms are not convinced of the benefits of including female directors. This may also be demonstrated by directors contending that the board is not interested in gender-diversity, due to the lack of interest shown by the shareholders (Rawlinson, 2018).

Therefore, convincing evidence is required on the effectiveness of female directors, given the aforementioned doubts regarding the capabilities of female directors. However, prior evidence examining the link between female directors on audit committees and audit quality is not convincing, which may have paved the way for the questions about the abilities of female directors. Aldamen et al. (2018) and Lai et al. (2017) find that female directors on audit committees are positively associated with audit fees, while Ittonen, Miettinen, & Vähämaa

(2010) and Sun, Liu, and Lan (2011) evidence that female directors on audit committees are insignificantly associated with audit fees and discretionary accruals respectively.

Regulators attach considerable importance to audit committees (Cadbury Committee, 1992), given that audit committees are responsible for the oversight of financial reports (Cohen, Hoitash, Krishnamoorthy, & Wright, 2014; Zalata et al., 2018) and thus ensure the reliability of financial statements. This is especially important in the current environment where corporate scandals have called into question the credibility of financial statements (Banham, 2018; Blackburn, 2019). Hence, given that Bédard and Gendron (2010) argue that audit quality determines whether a particular audit committee mechanism is effective, convincing evidence on the link between female directors on audit committees and audit quality may help assure firms of the capability of female directors. Given that practitioners possess detailed information about the audit, audit quality proxies directly capturing the practitioners' assessment of audit quality are likely to be the most appropriate audit quality measures (Aobdia, 2019) and therefore could be suitable for providing convincing evidence related to the association between female directors on audit committees and audit quality.

As argued in section 1.3, utilising both audit fees and meeting or beating the zero earnings benchmark effectively captures the practitioners' assessment of audit quality and thus can be considered to be the most potent procedure to capture audit quality when examining the effectiveness of audit committee mechanisms. However, prior research examining the link between female inclusion on audit committee and audit quality focuses on audit fees. Therefore, neither does any study utilises both audit fees and meeting or beating the zero earnings benchmark as audit quality proxies in the same study, nor do prior researchers adopt the measure of meeting or beating the zero earnings benchmark when examining this association. Moreover, this suggests that the previous research on female directors on audit committees and audit quality may have Type 1 error (Aobdia, 2019), as it fails to utilise meeting

or beating the zero earnings benchmark as an audit quality proxy in addition to audit fees. Hence, there is a need to examine the link between female directors on audit committees and audit quality by utilising both audit fees and meeting or beating the zero earnings benchmark, which may offer convincing evidence on the association between female directors on audit committees and audit quality.

Moreover, for the knowledge in a specific management area to progress, previous methodologies should be revised and challenged (Hoobler et al., 2018). Therefore, examining the link between female directors on audit committees and audit quality helps advance knowledge pertaining to the contribution of female directors towards audit committee effectiveness, as it challenges the previous method adopted by researchers and then uses an alternative methodology of considering the practitioners assessment of audit quality when choosing audit quality proxies.

1.5.2 Female financial experts on audit committees

Hillman and Dalziel (2003) introduce a theoretical framework in which agency theory and resource dependence theory are amalgamated to help explain directors' effectiveness. Their view suggests that agency theory may point out that female directors on audit committees improve the monitoring function, as they are unlikely to be part of the 'old boys club' (Adams & Ferreira, 2009, p. 292; Zalata et al., 2018) and thereby depict greater independence (Lai et al., 2017); however, incorporating resource dependency theory may indicate that this positive monitoring of female directors is likely to be dependent on the quality of female directors. Further, Kalbers and Fogarty (1993) contend that an audit committee is composed of individuals and thus the personal characteristics of these members also contribute towards the audit committee's effectiveness. This suggests that female directors' effectiveness on audit committees may be dependent on whether they possess certain attributes.

However, the prior literature (Ittonen et al., 2010; Zalata et al., 2018) examining female financial experts on audit committees and audit quality fails to consider the specific attributes of female financial experts and thus assumes that all female financial experts offer equal monitoring effectiveness. This points to the second research question of this study, where the specific attributes of female financial experts on audit committee are assessed in terms of audit quality. This is also important in the context of current evidence suggesting that female directors' effectiveness is driven by the specific attributes possessed by them, which is likely to also contribute towards the literature identifying the characteristics that contribute towards their effectiveness in terms of financial reporting oversight. Current literature (Bravo and Alcaide-Ruiz, 2019) assesses accounting and non-accounting female financial experts on audit committees in terms of forward-looking disclosures in voluntary section of annual reports, therefore, there is no study that examines whether all types of female financial experts are effective in enhancing audit quality. Audit quality is a vital construct, given that it strengthens the integrity of financial reports and thereby heightens the confidence of investors in the financial reports.

Financial expertise is a vital component in ensuring better oversight of financial reports. This is because of the greater knowledge of the financial experts in relation to the financial statements (Tanyi & Smith, 2015). Regulators also focus on the financial expertise of the audit committee members such as the SEC (Securities Exchange Commission) in the US (United States) and the UK Corporate Governance Code (Ghafran & O'Sullivan, 2017) in the UK. However, "debate around the definition of financial expert in terms of accounting and non-accounting" (García-Sánchez, García-Meca, & Cuadrado-Ballesteros, 2017, p. 53) suggests that there is uncertainty as to whether each category of financial expertise is capable of contributing towards the monitoring of financial reports. Belgian Corporate Governance Code requires firms to include an audit committee member with audit and accountancy skills

(Vlaminck & Sarens, 2015). Similarly, New Zealand Securities Commission recommends inclusion of an accounting expert on an audit committee (Rainsbury, Bradbury, & Cahan, 2009). However, although the SEC and the UK Corporate Governance Code made efforts to regard only accounting expertise as financial expertise to meet the requirement of including a financial expert on audit committees, these regulators had to consider both accounting and non-accounting expertise as financial expertise after the feedback from the stakeholders (FRC, 2015; Ghafran & O'Sullivan, 2017; Lee & Park, 2018). Similarly, empirical evidence is also mixed in the financial reporting context. Some (Krishnan & Visvanathan, 2008, 2009) studies evidence that only accounting experts on audit committees perform the monitoring function while some (Ghafran & O'Sullivan, 2017; Goh, 2009; Badolato, Donelson, & Ege, 2014) find that only non-accounting experts on audit committees act as monitors of financial reports. Given this uncertainty, it is important to empirically test whether both accounting and non-accounting female financial experts act as effective monitors.

Additionally, current literature (Bravo and Alcaide-Ruiz, 2019; Bennouri, Chtioui, Nagati, & Nekhili, 2018; Elmaghri, Ntim, Elamer, & Zhang, 2019; Gull, Nekhili, Nagati, & Chtioui, 2018) substantiates that female directors do improve monitoring effectiveness, however, this impact is dependent on the specific attributes of female directors. Therefore, examining female accounting and non-accounting experts on audit committees in terms of audit quality also helps contribute towards the mixed evidence on the financial reporting oversight capabilities of accounting and non-accounting experts on audit committees.

1.5.3 Female accounting experts on audit committees

Accounting experts on audit committees with CFO (Chief Financial Officer) expertise may not be effective, as the role of CFOs has shifted from accountancy-related to strategy and managing investors relations (Abernathy, Beyer, Masli, & Stefaniak, 2014; Aier, Comprix, Gunlock, & Lee, 2005), which may suggest that accounting expertise derived from CFO experience

encompasses weak accounting knowledge (Aier et al., 2005). On the other hand, accounting experts with public accounting expertise possess greater accounting knowledge (Abernathy et al., 2014; Hoitash, Hoitash, and Kurt, 2016). However, as CFOs are responsible for preparing financial reports (Billings, Gao, & Jia, 2014; Jiang, Petroni, & Wang, 2010), they may be technically proficient in accountancy skills. Given the conflicting arguments pertaining to the effectiveness of CFO experience, there is a need to empirically examine whether the female accounting experts with CFO experience on audit committees are as effective as female public accounting experts in monitoring financial reports. The theoretical framework of Hillman and Dalziel (2003), when applied to female directors on audit committees, suggests that agency theory indicates better monitoring of female directors on audit committees, but when resource dependence theory is amalgamated with agency theory, the positive monitoring could be derived from the particular qualities brought by the female directors.

Further, this is also important in the context of current literature suggesting that the effectiveness of female directors is contingent on whether they possess certain characteristics. Thus, the empirical testing of public accounting and CFO expertise of female accounting experts on audit committees is also likely to contribute towards the literature by discerning the attributes contributing to the effectiveness of female directors.

1.6 Research aims

- Examine the association between female directors on audit committees and audit quality
- Assess female accounting and non-accounting experts on audit committees in terms of audit quality
- Investigate whether female public accounting and CFO experts on audit committees are associated with audit quality

1.7 Summary of the results

This study finds that female directors on audit committees are positively and significantly associated with audit quality. Further, it evidences that female accounting experts on audit committees have a positive and significant association with audit quality, while female non-accounting experts on audit committees are insignificantly associated with audit quality. This thesis also finds that female public accounting experts on audit committees are significantly and positively associated with audit quality, whereas female CFO experts on audit committees have an insignificant association with audit quality.

1.8 Contributions of the study

This thesis contributes to the literature in multiple ways. Firstly, by utilising the most appropriate audit quality proxies in the context of audit committees, namely audit fees and the propensity to meet or beat the zero earnings benchmark, this study effectively captures the audit quality assessments of practitioners and thus provides convincing evidence on the effectiveness of including female directors on audit committees. As the study finds that female directors on audit committees are positively associated with audit fees and negatively linked with meeting or beating the zero earnings benchmark, it contributes to the audit quality literature.

Secondly, this study tests the various types of financial expertise of female directors on audit committees and finds that female accounting experts, particularly public accounting experts, are positively associated with audit quality. It, therefore, contributes to the recent literature suggesting that the positive monitoring of female directors is dependent on the specific attributes possessed by female directors. Furthermore, this finding also contributes to the audit quality literature, as it suggests that female public accounting experts on audit committees increase audit quality.

Thirdly, it furthers the research of Zalata et al. (2018), who call for additional research in which female accounting and non-accounting experts on audit committees are examined in the context of financial reporting oversight. Fourthly, by finding that certain female financial experts are ineffective in monitoring financial reports, this study provides valuable insights into the research by Zalata et al. (2018).

Fifthly, there is mixed evidence (Krishnan & Visvanathan, 2008, 2009; Ghafran & O'Sullivan, 2017; Goh, 2009; Badolato et al., 2014) pertaining to whether accounting or non-accounting expertise is effective in overseeing financial reporting process. Therefore, this study's finding that female accounting experts, specifically public accounting experts, on audit committees act as effective monitoring mechanism contributes to the debate surrounding the type of financial expertise that is beneficial for audit committees. This contention is based on the current evidence suggesting that the greater monitoring of female directors is driven by specific characteristics possessed by them.

Sixthly, after finding that the effectiveness of female financial experts on audit committees is driven by accounting expertise, this result provides valuable insight into the conflicting evidence pertaining to the association between female financial experts on audit committees and financial reporting monitoring. Although Zalata et al. (2018) substantiate that female financial experts on audit committees enhance monitoring, Ittonen et al. (2010) do not find any significant association. Our result, hence, suggests that the conflicting evidence may have been because of the varying composition of female accounting and female non-accounting experts in the sample of these studies. Lastly, this research applies the theoretical framework of Hillman and Dalziel (2003) to the context of female financial experts on audit committees. Our study's findings support this theoretical framework, as we find that positive monitoring of female financial experts on audit committees is driven by their specific attributes.

1.9 Structure of the thesis

The structure of this thesis is as follows. Chapter one provides the background of this study in which the motivations and contributions are also discussed. Chapter two overviews the related literature. Chapter three explains the theoretical framework adopted by this research. Chapter four details the methodology selected. Chapter five (female directors on audit committees and audit quality), six (female financial experts on audit committees and audit quality) and seven (female public accounting and CFO experts on audit committees and audit quality) present the empirical results, while chapter eight concludes this research.

Chapter 2: Literature review

2.1 Female directors on audit committees

There are multiple mechanisms through which female directors are able to positively affect the monitoring of financial reports and thereby improve audit quality. Women are likely to exhibit higher ethical behaviour than men (Arun, Almahrog, & Aribi, 2015; Lai et al., 2017; Pucheta-Martínez, Bel-Oms, & Olcina-Sempere, 2018; Smith & Oakley, 1997) "because of the more communal values into which women are socialized" (Sun et al., 2011, p. 370; Mason & Mudrack, 1996). Bernardi, Bosco, and Columb (2009) find that the presence of female director results in firms being labelled as ethical. In a similar vein, Arlow (1991), Cohen, Pant, and Sharp (1998) and Ruegger and King (1992) find that females depict greater ethical behaviour. Further, Betz, O'Connell, and Shepard (1989) find that females are unlikely to engage in unethical activities such as transfer of company funds to their personal accounts and violating company policy in estimating expense reports to save time. Similarly, women are linked with helping people, while men are focused on financial gains (Krishnan & Parsons, 2008; Betz et al., 1989; Arun et al., 2015). Therefore, women, in comparison to men, are more likely to be ethically sensitive and thus display a more caring and compassionate nature (Bampton & Maclagan, 2009; Eweje & Brunton, 2010; Stedham, Yamamura, & Beekun, 2007).

This suggests female directors may be unlikely to tolerate policies depicting opportunistic stance (Ameen, Guffey, & McMillan, 1996; Srinidhi, Gul, and Tsui, 2011; Zalata et al., 2018), which corroborates with the argument that women have different values at work and thereby affect decisions in organisations (Chusmir, Koberg, & Mills, 1989; Crow, Fok, Hartman, & Payne, 1991). As a result, female directors are unlikely to be involved in practices that involve collusion with the management to manipulate financial reports for personal benefit, as the compassionate nature of females may mean considering the interests of shareholders over self-centric interests, ultimately resulting in objective monitoring of financial reports.

Kaplan, Penny, Samuels, and Zhang (2009) find that females are more likely to disclose fraudulent financial reporting practices. Anecdotal evidence also seems to suggest such female practices, as Sherron Watkins (Enron) and Cynthia Cooper (WorldCom) were also women who acted as whistle-blowers and raised financial reporting frauds (Srinidhi et al., 2011). In relation to the Enron scandal, Ackman (2002) points out that several people were aware of the dubious accounting of Enron but it was Sherron Watkins who exposed it.

Difference in risk attitudes may also suggest distinct monitoring of female directors. Meta-analysis evidence by Byrnes, Miller, and Schafer (1999) supports the contention that females undertake less risk than men. Risk-averse nature of women may stem from reasons such as the more restrictive parental oversight translating into females undertaking limited risk in their future life and the higher life expectancy of females leading them to adopt less risky behaviour because otherwise it would mean living for longer period of time with the negative consequences from risky behaviour (Watson & McNaughton, 2007; Felton, Gibson, & Sanbonmatsu, 2003; Hersch, 1996).

In the context of financial professionals, Olsen and Cox (2001) find that women attach greater weight to potential of loss and also are more sensitive to uncertainty. Watson and McNaughton (2007) also evidence that women choose less risky investment options. Similarly, Felton et al. (2003), using the research setting of students to assess their investment behaviour, find that females pursue low risk strategy than males. Further, Sundén and Surette (1998) report that females allocate assets of low risk nature to their pension plans. Hence, the greater risk-averse nature of females than males (Man & Wong, 2013; Powell & Ansic, 1997; Srinidhi et al., 2011; Thiruvadi & Huang, 2011) suggests that female directors may favour intensive monitoring to safeguard the reputation of the board (Lai et al., 2017; Srinidhi et al., 2011), as Srinivasan (2005) finds negative reputational consequences for audit committee members after financial reporting failure.

Further, female directors are likely to be hard working in nature (Ittonen et al., 2010; Pucheta-Martínez, Bel-Oms, & Olcina-Sempere, 2016) and demonstrate a lack of over-confidence (Srinidhi et al., 2011; Barber & Odean, 2001; Krishnan & Parsons, 2008). As part of evidence of showing that female directors are less overconfident than men, Huang and Kisgen (2013) find that female executives are linked with less narrow range related to earnings forecast. Moreover, Huse and Solberg (2006) report that females are better prepared in meetings than men. Similarly, Thiruvadi (2012) substantiates that female directors on audit committees are positively linked with number of audit committee meetings. In a similar vein, Adams and Ferreira (2009) evidence that female directors are associated with greater attendance at board meetings. Also, females may show greater compliance towards regulations (Kastlunger, Dressler, Kirchler, Mittone, & Voracek, 2010; Khlif & Achek, 2017), as Clatworthy and Peel (2013) evidence that gender-diversity on boards has a positive association with filing accurate financial reports. Cullis, Jones, and Lewis (2006) find that females are more likely to be tax compliant. Therefore, female directors are likely to demonstrate diligent monitoring (Srinidhi et al., 2011) and thereby ensure greater compliance with accounting regulations.

Moreover, regulators' policies towards enhanced representation of female directors (Lai et al., 2017; Srinidhi et al., 2011) also seem to suggest the favourable opinion that the legislator have towards female directors. Baroness Hogg, Chairman of FRC, commented that:

> The FRC believes that diversity at the board table can help to make boards more effective, for example by reducing the risk of 'group think'. The change we made to the code last year has helped to trigger a significant change in attitude to the persistent failure of companies to appoint more women to boards, depriving themselves of the benefits of the full talent pool available to them (Habib & Hossain, 2013, p. 95).

A further mechanism that displays the capabilities of female directors involves decision-making quality. Women depict better communicative capabilities (Zalata et al. 2018; Schubert; 2006; Ittonen et al., 2010) and also ask tough questions that are considered difficult for male

directors to pose (Gul, Srinidhi, & Ng, 2011; Huse & Solberg, 2006; Srinidhi et al., 2011; Lai et al., 2017). Furthermore, men often focus on the main agenda but overlook the details that females are able to identify (Chung & Monroe, 2001; Terjesen et al., 2009; Singh, 2008). Therefore, females are expected to improve the overall quality of discussions (Gul et al., 2011; Gul, Hutchinson, & Lai, 2013). Wood, Polek, and Aiken (1985) find that women perform better in tasks involving discussion. In addition, women also perform better at multi-tasking, which enables them to be better at integrated tasks (Ittonen et al., 2010; Schubert, 2006). This is important in the financial reporting context, as this also requires an integrative approach given that accounting standards frequently refer to other accounting standards (Ernst & Young (EY), 2010). Arun et al. (2015) find that female directors on boards reduce the extent of discretionary accruals and thus limit earnings manipulation.

Women have distinct management style that is characterised by cooperation, which is likely to cause greater information sharing (Gul et al., 2011; Schminke & Ambrose, 1997; Smith & Oakley, 1997), leading to more informed decision-making process and thereby enhanced transparency (Gul et al., 2011; Srinidhi et al., 2011). Pucheta-Martínez et al. (2016) evidence that female directors on audit committees decrease the probability of receiving qualified audit opinions due to errors, omission or non-compliance. In addition, they also conclude that female directors on audit committees are linked with greater likelihood of disclosure of the audit reports with qualifications related to uncertainties and scope limitations and conclude that this improves financial transparency. Similarly, Gul et al. (2013) find positive association between gender diversity on boards and more accurate earnings forecast by analysts and they conclude that this result shows greater transparency in financial reports. Empirical evidence also finds that female audit partners increase the likelihood of issuing going-concern opinions (Hardies, Breesch, & Branson, 2016), increase audit fees (Hardies, Breesch, and Branson, 2015; Ittonen

and Peni, 2012) and increase the quality of earnings reported (Garcia-Blandon, Argilés-Bosch, & Ravenda, 2019; Ittonen, Vähämaa, & Vähämaa, 2013).

Prior literature also examines the influence of female presence on audit committees. An Australian study by Aldamen et al. (2018) finds that female directors on audit committees are positively associated with audit fees. Similarly, Lai et al. (2017) evidence that female presence on audit committee increases audit fees in the US. They also utilise auditor choice (specifically, industry specialist auditor) as an additional measure to determine their auditing effectiveness and find that female directors on audit committees are associated with the higher likelihood of choosing an industry specialist auditor.

Gavious, Segev, & Yosef (2012) and Thiruvadi and Huang (2011) evidence that female presence on audit committees decreases discretionary accruals and thus reduces earnings management. Moreover, Srinidhi et al. (2011) study female directors on audit committees and find that they increase accruals quality. They also find that the presence of female directors on audit committees reduces the probability of meeting or beating the prior year's earnings and also the propensity to meet or beat the analysts forecast.

The review of the empirical evidence of prior researchers indicates that the researchers have not fully accounted for the practitioners' assessment of audit quality when examining the monitoring effectiveness of female directors on audit committees in terms of audit quality. As argued in section 1.3, in order to ensure the practitioners' evaluation of audit quality is captured in audit quality proxies utilised for examining audit committee mechanisms, adopting both audit fees and meeting or beating the zero earnings benchmark is vital. Neither do the researchers adopt meeting or beating the zero earnings benchmark nor does any study utilise both audit fees and the propensity to meet or beat the zero earnings benchmark in the same study to assess female directors on audit committees.

2.2 Female financial experts on audit committees

Directors tend to hold the view that female directors should have appropriate skills (Creary, McDonnell, Ghai, & Scruggs, 2019). Similarly, CEOs argue that for the female directors' inclusion to be an effective mechanism, they need to possess financial expertise (Whitler & Henretta, 2018). Moreover, although the European Commission proposed to implement the requirement to have 40% of the board as female, it reinforces that the female directors should have equal qualifications in comparison to male directors "in terms of suitability, competence and professional performance" (Leszczyńska, 2018, p. 45). Further, there are now a greater number of females with educational qualifications, and also current female directors on the boards may possess more ability due to their appointment as directors (Singh, Terjesen, & Vinnicombe, 2008). These arguments suggest that female directors' effectiveness on audit committees is likely to be driven by particular characteristics possessed by them.

2.2.1 Accounting experts on audit committees

Accounting experts are likely to possess specialist accounting knowledge, which is vital in the context of audit committees because they are responsible for reviewing the complex accounting areas where judgements are involved, overviewing the response of the management to the auditor's adjustments and monitoring the acceptability and quality of the financial reports (DeFond, Han, & Hu, 2005; Dhaliwal et al., 2010). As a result, Lipman (2004) argues that it would be "difficult to ask incisive questions of the auditor or management if the audit committee does not fully understand the accounting used by the company" (p. 30), and thus the accounting skills are likely to make audit committee members more able to question auditors and management (Lisic, Myers, Seidel, & Zhou, 2019; Dhaliwal et al., 2010; Pomeroy, 2010; Mangena & Pike, 2005). Krishnan and Visvanathan (2009) find evidence of a positive association between accounting expertise of audit committees and financial reporting quality. Similarly, Bilal, Chen and Komal (2018), Liu, Tiras, and Zhuang (2014), and Sultana and Zahn

(2015) find that accounting experts on audit committees are associated with mitigating earnings management.

Further, audit committee members themselves also consider that accounting expertise is pivotal (DeZoort, 1997), as it helps decipher the inconsistencies in financial reports (Gendron & Bédard, 2006; Pomeroy, 2010). One of the audit committee members interviewed by Gendron and Bedérd (2006, p. 226) states that:

> So if you don't understand a balance sheet how are you going to ask the questions? So, number one, you have to have the right characteristics. And you have to have the right kind of mind to think in terms of, what would this mean if this wasn't here, those sorts of things. And to have a challenging mind so that you do look at the numbers and can spot inconsistencies or funny kind of things that jump out at you and ask the questions as to why, and then hopefully get the right answers to satisfy yourself. It is through that challenging and answering process that you get the satisfaction and comfort that the numbers are right

DeZoort and Salterio (2001) evidence that greater auditing knowledge of audit committees leads to higher support for the external auditor when there is a dispute between the auditor and the management. Specifically, in the case of clients leaning towards recording form of a transaction, they show that the greater the audit knowledge among audit committees, the higher the support towards the auditor who advocates the substance rather than the form of the transaction. This is likely to make financial reports more reliable, as reflecting the substance of a transaction than the form is one of the characteristics that maintains the financial reporting quality (EY, 2018). Further, Kim Kwak, Lim, and Yu (2017) find that accounting experts on audit committees are positively associated with audit fees. Similarly, Beasley et al. (2009) attribute the poor oversight of the audit committee of Hollinger International Inc. to the lack of accounting experts represented on its audit committee, as they argue that this ineffective oversight persisted even after "Hollinger's audit committee had three financially literate members, each with significant public company director experience and impressive professional credentials. The members included a former governor/law firm chairman, a former

ambassador/investment banking and consulting firm chairman, and a senior fellow of an institute" (p. 67).

Another argument in support of accounting experts on audit committees having a positive influence on audit quality involves high monitoring intensity. Given their higher accounting knowledge, accounting experts on audit committees are motivated to enhance the monitoring extent in order to meet the greater job expectations and safeguard their exposure to enhanced reputation and litigation risk (Krishnan & Visvanathan, 2008; Kim et al., 2017). Raghunandan and Rama (2007) substantiate that accounting experts on audit committees are positively associated with diligent audit committee ascertained through audit committee meetings. In a similar vein, Sharma, Naiker, and Lee (2009) evidence that if the risk of poor financial reporting is high, then accounting experts on audit committees increase the number of audit committee meetings. Furthermore, Zain, Subramaniam, and Stewart (2006) find that the accounting and auditing expertise of an audit committee results in internal auditors attaching greater importance to their role in contributing towards a financial statements audit. They contend that if internal auditors assess that they positively play a part in financial statements audits then this shows an effective internal audit function, which causes external auditors to rely more on internal auditor's work and thus able to increase work in areas not tested by internal auditors, thereby leading to better audit quality.

It is also important to consider the views of auditors, as auditors meet with audit committees to provide an opinion on financial reports (Cohen, Krishnamoorthy, & Wright, 2002) and thus can offer valuable insights into the type of audit committee expertise valued by them. Practicing auditors such as PwC (PricewaterhouseCoopers), one of the Big 4 audit firms, attach high value to those audit committees that consist of members with financial reporting and auditing knowledge (PwC, 2011; Cohen et al., 2002). Supporting this argument, McDaniel, Martin, and Maines (2002) find that individuals possessing auditing experience are likely to evaluate

financial reporting issues in a way that encompasses financial reporting framework of accountancy regulatory bodies. Additionally, Chen and Zhou (2007) evidence that audit committees with accounting experts are associated with dismissing Anderson earlier. This is also an important finding because after the charge related to obstruction of justice was levied on Anderson (an auditing firm), there were still some firms that had Anderson as their auditor even after four months had elapsed after the aforementioned charge, which, given that audit committees are responsible for monitoring external auditors, questions the quality of the audit committee's monitoring of external auditors (Chen & Zhou, 2007).

Financial statement users also seem to be in favour of accounting experts on audit committees. Hermanson, Krishnan, and Ye (2009) substantiate that in the presence of accounting expertise on audit committees, the shareholders are more confident in the auditor chosen by the audit committee. Similarly, Dickins, Hillison, and Platau (2009) find that financial statement users, specifically financial analysts, have more confidence in financial reports if the audit committee has a director with accounting expertise. Moreover, Davidson, Xie, and Xu (2004) and DeFond et al. (2005) evidence that investors perceive audit committee members with accounting expertise as effective monitors. In a similar vein, Singhvi, Rama, and Barua (2013) evidence that market reacts negatively to departure of any audit committee member with accounting expertise.

In addition, accounting expertise is likely to enable an audit committee member to be more confident in asking challenging questions during meetings, given the greater competence, which is likely to enhance audit committee effectiveness (Gendron & Bédard, 2006). DeZoort (1998) finds that the auditing expertise of an audit committee leads to internal control assessments that are more in line with practicing auditors. In a similar vein, Lisic, Neal, Zhang, and Zhang (2016) substantiate that accounting experts on audit committees are negatively associated with internal control weaknesses. Further, Hoitash, Hoitash, & Bedard (2009)

evidence a positive link between the presence of accounting experts on audit committees and disclosing weak internal controls related to financial reports.

Also, firms in the US present non-GAAP (Generally Accepted Accounting Principles) earnings information based on the contention that it is a better reflection of their performance and future outlook, as it presents earnings before accounting for certain non-recurring expenses (Seetharaman, Wang, & Zhang, 2014). Non-recurring expenses such as restructuring costs are unlike operating expenses that occur on a regular basis (McVay, 2006). However, as non-GAAP earnings information is not audited (Frankel, McVay, & Soliman, 2011) and involves greater flexibility in terms of rules as compared to presenting according to GAAP, there is a higher scope for opportunistic behaviour of management in the non-GAAP earnings (Seetharaman et al., 2014). Previous SEC investigations include instances where the firms have converted earnings loss as per GAAP into non-GAAP profit (Merced, 2011). Seetharaman et al. (2014) evidence that accounting experts on audit committees are associated with lesser exclusions when ascertaining non-GAAP earnings.

2.2.2 Non-accounting experts on audit committees

The response towards the decision of SEC to only consider accounting experts as financial experts was critical, which led the SEC to also regard non-accounting experts as acceptable to fulfil the legislation of including at least one financial expert on an audit committee (Abernathy, Herrmann, Kang, & Krishnan, 2013; DeFond et al., 2005). The criticism was based on reasons such as the difficulty for firms to attract directors who meet the narrow definition of a financial expert and the contention that the oversight function can still be effectively performed by audit committee members who do not possess strong accounting knowledge (Krishnan & Lee, 2009; Kim et al., 2017). This is also similar to the situation in the UK where FRC had to revert to including both accounting and non-accounting experts as financial experts after the unsuccessful attempt at only regarding accounting experts as acceptable for meeting the Code's

provision of including a financial expert on audit committees (Ghafran & O'Sullivan, 2017). This suggests that some stakeholders hold positive views about non-accounting experts' monitoring ability, as non-accounting experts may be more motivated to enhance monitoring in order to address their lack of accounting knowledge (Ghafran & O'Sullivan, 2017). DeZoort (1998) argues that audit committee members with limited accounting skills are likely to be more cautious and more diligent.

As per resource dependency theory, non-accounting experts on audit committees provide important resources and skills such as industry knowledge, which is likely to improve the effectiveness of audit committees (Dhaliwal et al., 2010). Industry knowledge of audit committee members could be helpful in dealing with the complexities specific to a particular firm, which is likely to be a contributory factor in improving audit committee effectiveness, as the financial reporting process may include determining estimates related to the firm's industry, for example, provisions of warranty obligations may be linked with industry and construction industry knowledge may be needed for addressing the uncertainties pertaining to project completions (Cohen et al., 2014). Further, industry knowledge is also critical in the case of accounting for revenue in the software industry (Beasley et al., 2009). This suggests that the resources in terms of industry knowledge of audit committee directors are likely to be beneficial for effective monitoring (Dhaliwal et al., 2010). Furthermore, the audit tests conducted by an auditor can be better understood and thereby effectively assessed by the audit committee if the audit committee members possess industry-specific knowledge (Cohen et al., 2014). In addition, empirical evidence (Owhoso, Messier, & Lynch, 2002; Reichelt & Wang, 2010) suggesting that industry specialist audit firms perform better auditing could also indicate that non-accounting experts, through possessing industry knowledge as per resource dependence theory, can be expected to perform an effective monitoring function.

Further, Beasley and Salterio (2001) argue that an individual who has had a position such as the president of company is unlikely to have reached such a position without substantial knowledge of financial reporting. This is because such directors are responsible for overseeing employees with duties related to financial reporting (Naiker & Sharma, 2009) and hence may have developed financial reporting knowledge. Thus, directors with supervisory expertise may be capable to perform monitoring function if part of an audit committee (Beasley & Salterio, 2001). Goh (2009) substantiates that financial expertise on audit committees derived from supervision of financial reports is positively associated with timely remediating internal controls (pertaining to financial reporting) weaknesses of a material nature. Similarly, Hoitash et al. (2009) find that supervisory expertise on audit committees is positively related with disclosure of material weaknesses in the internal controls related to financial reports. Chen and Zhou (2007) evidence that supervisory experts on audit committees are associated with early dismissal of the auditor who has been charged with the obstruction of justice.

Additionally, Dhaliwal et al. (2010) argue that finance (non-accounting) experts are highly involved in forecasting earnings and assessing mergers and acquisitions. Thus, the finance experts may also have developed financial reporting knowledge through the experience of conducting financial statement analysis (Lee & Park, 2018). Further, finance experts may collect information directly from the management and thus are likely to become proficient in understanding industrial, legal and regulatory factors affecting firms and in assessing the repercussions of management's strategies, therefore, they may be more capable of evaluating whether the accounting depicts the substance of transactions, thereby leading to better financial reporting quality (Dhaliwal et al., 2010; Barker, 1998). Supporting these arguments, Trautman (2013, p. 231) reports the following arguments by SEC in favour of finance experts on audit committees:

> We recognize that many people actively engaged in industries such as investment banking and venture capital investment have had significant direct and close exposure to, and experience with, financial statements and related processes. Similarly, professional financial analysts closely scrutinize financial statements on a regular basis. Indeed, all of these types of individuals often hold positions that require them to inspect financial statements with a healthy dose of skepticism. They therefore would be well prepared to diligently and zealously question management and the company's auditor about the company's financial statements. Effective audit committee members must have both the ability and the determination to ask the right questions. Therefore, we have broadened this attribute to include persons with experience performing extensive financial statement analysis or evaluation.

Hoitash et al. (2009) substantiate that finance experts on audit committees are positively associated with disclosure of weak internal controls pertaining to financial reports. Moreover, Xie, Davidson, and DaDalt (2003) find that representation of audit committee members with investment banking experience (part of finance expertise) reduces the magnitude of discretionary accruals and thereby reduces earnings manipulation.

However, policy-makers negatively view the inclusion of CEOs to meet the requirement of a financial expert on audit committee, as they suggest that while these individuals may be outstanding they do not possess the accounting know-how to be capable to tackle the complexities of financial reporting (Trautman, 2013). DeFond et al. (2005) evidence that appointment of non-accounting experts on audit committees does not significantly induce any reaction from investors. Similarly, Singhvi et al. (2013) substantiate an insignificant association between the departure of a non-accounting expert on audit committee and market reaction. Further, Zhang, Zhou, and Zhou (2007) find that there is a greater likelihood of firms experiencing internal control weaknesses if the audit committee consists of less accounting experts. Moreover, Naiker and Sharma (2009) substantiate that supervisory expertise on audit committees increases internal control weaknesses.

The above literature review suggests no study examining the types of female financial experts on audit committees in term of audit quality. Bravo and Alcaide-Ruiz (2019) is the only study

that examines the effectiveness of the types of female financial experts. However, they utilised the context of forward-looking disclosures and, as per DeFond and Zhang (2014), audit quality is not captured through forward-looking disclosures. Moreover, they did not further divide the non-accounting expertise of female audit committee members into supervisory and finance expertise.

2.3 Female CFO and public accounting experts on audit committees

2.3.1 CFO experts on audit committees

Presently, CFOs deal with strategic issues, execute efforts to improve firm performance and are responsible for maintaining relations with investors (Agrawal, Goldi, & Huyett, 2013; Caglio, Dossi, & Stede, 2018; Abernathy et al., 2014). Furthermore, Coates, Marais, and Weil (2007) argue that the career paths of CFOs include positions such as treasurers and investment bankers, who are proficient in raising funds, but do not require accounting skills. The former chief auditor of PCAOB also contends that, currently, CFOs' ability to raise finance is worth more than their accounting skills (Aier et al., 2005; Abernathy et al., 2014), which can be corroborated by Hoitash et al. (2016) and Murphy (2013), who indicate a decreasing trend of firms hiring CFOs with professional accountancy qualifications. This may be the reason why the responsibilities of positions such as COOs (Chief Operating Officers), which involve tackling strategic issues, are being shifted to CFOs (Kwoh, 2012). In a similar vein, Caglio et al. (2018) argue that the CFOs' higher involvement in the strategic and operational side of businesses has meant more expectations from CEOs and boards to provide insights into all aspects of businesses. Further, they contend that the volatility around the global financial crisis may have enhanced the profile and expectations from CFOs, leading them to board conversations about risk management, forecasts, profitability, and strategic options. Appendix E presents few statements of CFOs. They demonstrate the limited attention towards the financial reporting responsibility of contemporary CFOs.

Consequently, Aier et al. (2005) and Rakhman (2009) argue that the deficient accounting skills of present CFOs results in poor financial reporting. Regulators also show concern over the poor accounting skills of CFOs, as the former chief accountant of SEC states that:

> A concern we have as users of financial statements, is the number of times we have spoken with CFOs or controllers who have expressed that they do not have sufficient expertise to properly prepare the financial statements (Rakhman, 2009, p. 2).

On the other hand, the CFO's responsibility includes preparation of financial reports (Billings, et al., 2014; Feng, Ge, Luo, & Shevlin, 2011; Ge, Matsumoto, & Zhang, 2011; Jiang et al., 2010). This is also the viewpoint adopted by the regulators, as the SOX in the US makes CFOs personally accountable for the credibility of the financial reports (Bishop, DeZoort, & Hermanson, 2017; Geiger & North, 2006; Jiang et al., 2010). Other regulators in Italy, China and France also follow such an approach (Caglio et al., 2018). This suggests that regulators view CFOs to be able to play a role in influencing financial reports. Further, audit committee expertise stemming from CFO experience may intensify the monitoring of audit committees, as Lisic et al. (2019) argue that audit committees with CFO experience may face a greater litigation risk as CFOs are entrusted with financial reporting responsibility.

CFOs have also been known to be involved in manipulating accounting, such as Scott G. Lasher, WorldCom's former CFO, who deliberately violated accounting rules (Feng et al., 2011), providing further indication of the technical knowledge of accounting possessed by CFOs, as such practices may only have been possible if the CFO had technical know-how in accounting. Empirical evidence also finds that CFOs have an influence on financial reporting. Geiger and North (2006) find that there is a significant influence on discretionary accounting accruals after a new CFO is appointed. They also find that this association persists even after controlling for the simultaneous appointment of a CEO, who is also responsible for financial reports. Similarly, Caglio et al. (2018), Graham, Harvey, and Rajgopal (2005) and Jiang et al.

(2010) also substantiate a significant association of CFOs with discretionary accruals. Moreover, Billings et al. (2014) suggest that auditors consider CFOs to have the capability to have an influence on financial reporting. As a result, audit committee members with CFO experience are likely to be equipped to monitor financial reporting issues.

Although the above discussion suggests the financial reporting knowledge of CFOs, it could be possible that it is driven by possessing public accounting expertise. Prior literature (Aier et al., 2005; Albrecht, Mauldin, & Newton, 2018; Rakhman, 2009) finds that public accounting CFOs are significantly associated with financial reporting. Therefore, this suggests that audit committee members' effectiveness is influenced by public accounting expertise rather than CFO experience.

Additionally, exposure to the business press and attending meetings may contribute towards an individual's knowledge about financial reporting quality (McDaniel et al., 2002), thus audit committee members with CFO expertise may still be able to influence monitoring. McDaniel et al. (2002) find that individuals with limited or deficient accounting knowledge are more likely to select unusual financial reporting items such as litigations and discontinued operations for discussion, given that they are unlikely to be capable of focusing on recurring financial reporting issues, due to a lack of accounting know-how. As a result, audit committee members with CFO expertise may enhance monitoring by bringing forward distinct financial reporting issues to the audit committee meetings.

Further, CFOs are likely to feel higher responsibility towards financial reporting, as any subsequent corporate reporting failure subject to investigations by regulators may lead to legal liabilities and negatively affect their career (Lisic et al., 2019), which may cause CFOs to be more vigilant in their financial reporting role. This suggests that CFOs may still be technically equipped in financial reporting skills. Chen, Chang, & Lee (2019) find that CFOs who have

held a previous CFO position are positively linked with tax avoidance. This is likely to depict higher accounting knowledge of CFOs, as such expertise, which enables CFOs to take advantage of discretion in the accounting rules in order to reduce tax payable, requires accountancy skills (Chen et al., 2019).

Also, CFOs regularly meet with auditors, and also work with auditors in planning audits and providing audit evidence (Beck & Mauldin, 2014; Hellman, 2011). Gibbins, McCraken, and Salterio (2007) argue that usually CFOs undertake the responsibility of being the only senior management representative responsible for addressing issues with the external auditors. As auditors provide an opinion on firms' financial reporting, these interactions of CFOs with auditors are likely to be indicative of higher financial reporting knowledge of CFOs, because they would only be able to discuss issues with auditors if they possess knowledge about financial statements issues. Lisic et al. (2019) find that accounting expertise on audit committees is positively associated with adverse auditor opinion on internal controls and thus helps auditors in detecting problems in internal controls over financial reports. They also find that the accounting expertise of audit committees reduces the likelihood of auditor dismissal after an adverse opinion on internal control. However, these associations only persist when the definition of accounting expertise includes CFOs.

2.3.2 Public accounting experts on audit committees

As public accounting experts encompass professional accountants with accountancy certifications, McDaniel et al. (2002) argue that professional accountancy certifications help develop direct know-how pertaining to provisions of accountancy bodies. This is important, as the companies produce financial reports by following the accountancy principles set by these bodies. Thus, the greater knowledge of public accounting experts is likely to lead them to be in a better position to monitor the compliance with the financial reporting regulations. In addition, Lisic et al. (2019) argue that professional accountants have to adhere to the provisions

of the professional accounting bodies awarding such qualifications (which include the use of professional judgement to protect public interests), hence, motivated by these provisions, public accountants are likely to be more effective in ensuring ethical financial reporting. The Smith Committee (2003) argues that it is highly recommended for an audit committee to include a member of a professional accountancy body.

McMullen and Raghunandan (1996) substantiate that firms with financial reporting problems are less likely to have professional accountants on their audit committees. In addition, DeZoort, Hermanson, and Houston (2003) evidence that audit committee members, who possess professional accounting certifications, are more likely to support auditors in the case of disputes between management and auditors. Similarly, Sun, Johnson, and Rahman (2015) find that stakeholders are less concerned about a firm's corporate governance when the CFO of the firm is a professional accountant.

Further, accounting training of public accountants involves prudent financial reporting, thereby such directors are likely to be risk-averse (Ge et al., 2011; Hoitash et al., 2016). This may have a positive impact on the extent of monitoring demanded by audit committee members with professional accounting qualifications in order to ensure that there is a minimum risk of material misstatements in financial statements. In an Australian context, Baxter and Cotter (2009) find that audit committees consisting of members with professional accountancy qualifications are positively associated with earnings quality. DeZoort, Hermanson, and Houston (2008) find that those audit committee members who are professional accountants are more likely to be supportive of auditor-proposed amendments. Further, Barua, Rama, and Sharma (2010) find that audit committee with public accounting expertise, rather than the one with non-public accounting expertise (in this category they included CFO experience), increases audit committee effectiveness by substituting for internal audit.

The above review of literature suggests no prior study focuses on examining female directors on audit committees with public accounting and CFO experience in terms of audit quality.

Chapter 3: Theoretical framework

3.0 Introduction

In this chapter, theories that underpin the research questions are presented. First, agency theory is described, and then it is explained how agency theory explains the link between female directors on audit committees and audit quality. Second, an integrated theoretical framework (agency theory and resource dependence theory) is presented, which can be utilised to suggest a link between the characteristics of female audit committee members and audit quality.

3.1 Agency theory

According to agency theory, the relation between managers and shareholders is that of an agency contract, where the principals (shareholders) delegate the authority to make the firm's decisions to agents (managers) (Hillman & Dalziel, 2003; Jensen & Meckling, 1976). As there is separation of ownership and control, there is a potential for conflicts of interests among managers and shareholders (Baysinger & Butler, 1985; Zalata et al., 2018). This theory, thus, suggests that managers are likely to pursue policies that cater to their personal interests at the cost of shareholders' interests (Jensen & Meckling, 1976; Hillman, Shropshire, Certo, Dalton, & Dalton, 2011), and one of the mechanisms in which the managers can execute their opportunistic behaviour involves manipulation of financial reports (Dhaliwal et al., 2010; Ittonen et al., 2013; Xie et al., 2003).

Audit committees provide a mechanism in which these agency costs can be mitigated, as it is responsible for monitoring financial reports to maintain the credibility and integrity of financial statements (Dhaliwal et al., 2010; DeZoort et al., 2002; Klein, 2002). However, DeZoort et al. (2002) posit that audit committee effectiveness is contingent on the characteristics of audit committees. Therefore, given that female directors are expected to maintain a higher level of independence from management because they are unlikely to be linked to, or be part of, any

male networks (Adams & Ferreira, 2009; Zalata et al., 2018; Lai et al., 2017), they are more likely to effectively perform their audit committee duties related to monitoring of financial reports (Lai et al., 2017; Srinidhi et al., 2011). Hence, female directors on audit committees are expected to enhance audit quality, as Bédard and Gendron (2010) contend that audit quality ascertains the effectiveness of audit committee mechanisms. Further, audit committees are responsible for monitoring external auditors (Cohen et al., 2002; Smith Committee, 2003). Thus, female directors, as part of their duty to monitor financial reports, are likely to demand additional auditing from the external auditors. Empirical evidence (Aldamen et al. 2018; Lai et al., 2017; Srinidhi et al., 2011) also supports the contention pertaining to the capability of female directors to reduce agency costs by performing effective oversight of financial reports.

3.2 Agency theory and resource dependence theory

Agency theory, however, cannot provide a clear explanation for the association between diversity on boards and organisational performance (Carter, Simkins, & Simpson, 2003; Gull et al., 2018). This is in line with Ben-Amar, Francoeur, Hafsi, and Labelle (2013), who contend that utilising other theories apart from agency theory provides more valuable insight into the effectiveness of corporate governance mechanisms. The application of only agency theory assumes that all independent directors are effective monitors, which ignores the directors' ability to execute effective monitoring (Hillman & Dalziel, 2003; Hillman, Nicholson, & Shropshire, 2008). Therefore, this assumption suggests that if female directors depict more independence due to their lack of association with male networks (Elmaghri et al., 2019; Zalata et al., 2018) then this is enough for effective monitoring. However, this may not be the case, as there could be specific attributes that may drive the monitoring effectiveness of female directors (Gull et al., 2018; Bennouri et al., 2018).

On the other hand, in resource dependency theory, directors' capital, such as knowledge, expertise, and experience, could affect the performance of the individual, thereby affecting the

organisation (Hillman & Dalziel, 2003). Moreover, when a firm appoints directors it expects them to support the organisation (Hillman & Dalziel, 2003). Similarly, an executive director states that the directors' effectiveness is based on their ability (Roberts, McNulty, & Stiles, 2005). This is line with the contention that "differences among directors are perhaps most visible in terms of their individual experience or occupational attributes", as directors possess distinct attributes reflecting diverse resources such as expertise and skill (Hillman, Cannella, & Paetzold, 2000, p. 239). Thus, in the case of resource dependency theory, directors act as providers of resources rather than as a monitoring mechanism of management's activities (Hillman & Dalziel, 2003). However, solely considering resource dependency theory assumes that all directors will apply their skills (Hillman et al., 2008). This is unlikely to be the case, as the directors also need to be independent from management as well in order to objectively monitor managers (Hillman et al., 2008). As female directors are likely to be more independent (Adams & Ferreira, 2009; Elmaghri et al., 2019; Lai et al., 2017), they are expected to be in a better position to monitor.

Hence, Hillman and Dalziel (2003) propose a theoretical framework comprising of both agency theory and resource dependence theory and argue that integrating "monitoring and the provision of resources will not only more accurately reflect the real world but also may overcome theoretical weaknesses in choosing one approach over another" (p. 388). Dhaliwal et al. (2010) also adopt this theoretical framework (combining agency and resource dependence theory) to study the characteristics of accounting experts on audit committees and argue that this particular theoretical approach is more appropriate for depicting the practical world.

Therefore, when applying this integrative theoretical framework to female directors on audit committees, it suggests that the link between female directors on audit committees and positive oversight of management in the form of higher audit quality is expected to be contingent on whether the female directors possess specific qualities. Furthermore, amalgamating agency

theory with resource dependence theory to study the link between audit committee mechanisms and their effectiveness is akin to adopting a deeper viewpoint of agency theory, as per Dhaliwal et al. (2010).

Recent empirical evidence seems to conform to this theoretical framework. Gull et al. (2018) find a positive association between female directors on the board and financial reporting, which supports agency theory, however, they also study various attributes of female directors and substantiate that the positive monitoring effectiveness of female directors originates from the particular characteristics of female directors. Similarly, Bennouri et al. (2018) and Elmaghri et al. (2019) also substantiate that better firm performance and environment performance respectively is associated with female directors' specific characteristics. Further, Bravo and Alcaide-Ruiz (2019) evidence that the association between female directors on audit committees and forward-looking disclosures is contingent on the type of financial expertise held by them.

3.3 Summary

This chapter, firstly, described how the agency theory could be utilised to suggest a link between female directors on audit committee and audit quality. In the second section of this chapter, the theoretical framework proposed by Hillman and Dalziel (2003) was presented. In this section, it was explained that combining agency theory and resource dependency theory may suggest that the link between female directors on audit committee and audit quality may be driven by the characteristics/qualities of female directors.

Chapter 4: Research methodology

4.0 Introduction

In this chapter, the reasons for selecting a particular research philosophy are presented. Further, it also explains why a quantitative research is suited for this study. In addition, it explains the research context of the study, details the data sources and explains the quantitative tools adopted by this study.

4.1 Research approach

This section involves selecting between research philosophies of positivism and interpretivism (Alam, 2015). Coetsee (2010, p. 5) argues that the:

> focus of a positivist framework is to find truth by describing the reality. The empirical tool gives the research process validity. The starting point is a descriptive approach, but by incorporating the empirical testing tools to explain and predict the phenomenon, positivism is created.

Hence, the positivism approach validates the knowledge by utilising appropriate methodologies (Lee, 1992), whereas interpretative philosophy involves:

> the perceptions and feelings of people – the reasons why they acted in a certain way. Interpretative research offers insights into how a given person, in a given context, makes sense of a given phenomena. It is not theory driven by setting and testing hypotheses. (Coetsee, 2010, p.11).

This suggests that interpretive philosophy interprets phenomena on a subjective basis through considering the opinions of the subject in the study (Alam, 2015). In comparison to the interpretive approach, the positivism approach is expected to be more generalisable (Lopes, 2015). Further, given that positivism is aligned with quantitative methodology (Bryman, 1984) and this study involves addressing research questions quantitatively, adopting this research philosophy is more appropriate. A further argument supporting positivism involves strengthening the credibility of accounting research, given that academia may not consider any research in accountancy as scholarly if it is not quantitative (Ghafran, 2013).

This study adopts quantitative research, given that it is in line with the positivism approach (Bryman, 1984; Lopes, 2015), as mentioned earlier. Additionally, the research questions of this thesis require numeric data, hence, a quantitative approach is more suitable (Williams, 2007). Further, this methodology is also chosen because most of the prior audit committee literature utilises such approach (Alam, 2015).

Quantitative research involves gathering, organising, and then analysing data, using quantitative tools, while qualitative research provides a deeper insight into the research under investigation and involves interviews with a specific group to understand why and how individuals choose a particular direction (Alam, 2015).

4.2 Research setting

This study adopts the context of the UK to answer the research questions. There is a comply or explain regime of corporate governance in the UK (Ghafran & O'Sullivan, 2017), whereby the firms are free to select a particular corporate governance practice; however, in the case of non-compliance with the provisions of the Corporate Governance Code, they have to explain the reasons for doing so (Marquardt & Weidman, 2016). This offers more variability in data. This is in contrast to other countries, where it is compulsory for firms to follow a set of defined corporate governance rules (Lai et al, 2017). Moreover, according to Wu, Hsu, & Haslam (2016), adopting the research setting of the UK helps generalise the findings. This stems from the lower litigation risk faced by the directors in the UK as compared to the US (Khurana & Raman, 2004; Wu et al., 2016), as the greater frequency of lawsuits in the US (Brennan & McGrath, 2007; Seetharaman, Gul, & Lynn, 2002) suggests such a case. This is vital for this study, given that if female audit committee members improve the monitoring process, then conducting research to discern such findings in an environment where the litigation risk is high may mean that it is the greater litigation risk arising from poor financial reporting that is causing the directors to enhance monitoring rather than the female directors themselves.

4.3 Data sources

The following applies to all three of the research questions. Data for this study was collected from multiple sources. The main variables pertaining to female audit committee members were collected from the annual reports of the companies. Further, these annual reports were downloaded from the firms' websites. Other corporate governance variables, auditors' location and firms' subsidiaries were also obtained from the annual reports. With regards to the other firm characteristics controlled in this study, except for the information about the location of the firms' auditor and number of firms' subsidiaries, data was collected from the FAME (Financial Analysis Made Easy) database (FAME is supplied by Bureau Van Dijk and holds information pertaining to registered UK firms (Chaney, Jeter, & Shivakumar, 2004, p. 58; Helmers & Rogers, 2010)). However, the Osiris database was utilised for collecting market value of equity and market price return (part of the control variables in the model where meeting or beating the zero earnings benchmark is the dependent variable). In addition, in order to identify the industry dummies, this research adopted GICS (Global Industry Classification Standard) in the Osiris database.

4.4 Sample and data analysis

This study utilises the FTSE 350 index to answer the research questions. The FTSE 350 index is the combination of the FTSE 100 index and the FTSE 250 index, therefore, it comprises of the top 350 companies (in terms of market capitalisation) listed on the London Stock Exchange (Cocco & Volpin, 2013; Zhang & Gregoriou, 2019). As financial firms have a distinct financial reporting and regulatory reporting framework (Ghafran & O'Sullivan, 2017; Lueg, Punda, & Burkert, 2014; Zalata et al., 2018), this study focuses on non-financial firms. Prior research on audit committees (Lai et al., 2017; Zalata et al. 2018) has also omitted financial firms. Therefore, all non-financial firms on the FTSE 350 index from 2009 to 2017 were the target of

this study. However, some firms had to be excluded due to either missing annual reports or the information pertaining to the firm's financial characteristics not being available.

Furthermore, in line with Ghafran and O'Sullivan (2017), a few firms that were not constituent of FTSE 350 index continuously from 2009 to 2017 were also excluded because of varying corporate governance principles that the UK Corporate Governance Code applies to FTSE 350 index and non-FTSE 350 index firms. For example, majority of the board should be independent for FTSE 350 index firms (such a requirement is not applicable for non-FTSE 350 index firms), less stringent audit committee independence requirements for non-FTSE 350 index firms (FRC, 2018; Ghafran & O'Sullivan 2017).

Further, this thesis focuses on FTSE 350 index firms in order to ensure that more data is collected (Lueg et al., 2014), and also to cover both large and small firms (Lueg et al., 2014; Zaman, Hudaib, & Haniffa, 2011). Moreover, this study adopts ordinary least-squares regression as the methodology to address the research questions. Prior researchers concentrating on audit committee issues such as Aldamen et al. (2018), Bravo and Alcaide-Ruiz (2019) and Zalata et al. (2018) also utilise ordinary least-squares regression for empirical analysis.

This study also mitigates the issues arising from bias in the standard errors due to time-series dependence and cross-sectional dependence, which may arise in this sample because of the presence of firms in multiple years (Peterson, 2009; Zalata et al., 2018). This study addresses these issues by clustering standard errors at the firm level and by utilising time dummies (Ghafran & O'Sullivan, 2017; Hassanein & Hussainey, 2015). Moreover, in order to address the bias due to endogeneity, this research utilises two-stage least squares regression and propensity score matching analysis.

4.5 Summary

This chapter explained the research methodology of this study. It provided reasons for choosing a particular research approach. Also, this chapter detailed the data sources and the sample of this study. In addition, for the purpose of analysing the data, it explains the quantitative tools that are adopted by this thesis.

Chapter 5: Female directors on audit committee and audit quality

5.1 Introduction

According to the agency theory, there is a conflict of interests between managers and shareholders (Zalata et al., 2018). Agency conflict may cause managers to manipulate financial reports in order to conceal the actual performance of the firm (Dhaliwal et al., 2010). Audit committees are responsible for assessing financial reports and monitoring external auditor's work (Aldamen et al., 2018; DeZoort et al., 2008; Smith Committee, 2003) and thereby are likely to mitigate these agency costs (Dhaliwal et al. 2010). Bédard and Gendron (2010) contend that audit quality is one of the mechanisms with which the effectiveness of an audit committee could be determined. Further, DeZoort et al. (2002) argue that the audit committee composition influences the extent of its effectiveness and thus it could be argued that female directors would be an important addition to audit committees. This contention is based on the plethora of legislators focusing their attention on greater presence of female directors, as countries either implement female quotas or pressurise firms with threats of enforcing quotas (Adams & Ferreira, 2009; Lai et al., 2017; Terjesen & Sealy, 2016), suggesting that regulators consider female directors to be effective at monitoring management. Furthermore, females are likely to be risk-averse and more ethical, which enhances the extent of monitoring and thereby maintains the integrity of financial reports (Betz et al., 1989; Byrnes et al., 1999; Cohen et al., 1998; Lai et al., 2017).

Despite the regulatory policies in favour of female directors, the firms are not convinced about the benefits of female directors. Main and Gregory-Smith (2018) find that the UK firms hire female directors symbolically in order to meet the regulator's demand of including female directors. Also, there are a number of firms in the FTSE 350 index that do not include female directors (Neate, 2018; Rudgard, 2018) or demonstrate slow progress towards greater representation of female directors expected by the regulators (Main & Gregory-Smith, 2018;

Neate, 2018). One of the directors of such firms states that shareholders are not interested in how the board is composed (Rawlinson, 2018; Schutte, 2018). This suggests that firms still have doubts about the monitoring effectiveness of female directors. We contend that this may be because of the unconvincing evidence on the link between female directors on audit committees and audit quality, as it does not effectively account for the practitioners' assessment of audit quality.

Aobdia (2019) argues that the researchers' use of indirect proxies to capture unobservable audit processes is a weak approach to capture audit quality. Therefore, he suggests that determining audit quality from the practitioners' (regulatory bodies and audit firms) perspective is a more effective way to ascertain audit quality, given that they possess more information pertaining to the firm's audit. As a result, we aim to incorporate the practitioners' evaluation in ascertaining audit quality and thereby provide convincing evidence on the link between female directors on audit committees and audit quality.

In order to examine the association between the existence of female directors on the audit committees and audit quality, the UK offers an appropriate research context. Given that the UK enforces comply or explain approach towards corporate governance (Ghafran & O'Sullivan, 2017), it offers flexibility to firms in following corporate governance principles, suggesting more varying firms' policies. Moreover, greater cases of class-action suits in the US (Brennan & McGrath, 2007; Seetharaman et al., 2002) suggests lower litigation risk in the UK when compared to the US (Khurana & Raman, 2004; Wu et al., 2016). Therefore, choosing the UK context allows us to attribute any positive monitoring to female directors on audit committees as opposed to the enhanced monitoring from the fear of litigation.

This study contributes to the literature in the following manner. Aobdia (2019) and Bell et al. (2015) propose to consider audit quality from the practitioners' viewpoint as they possess more

information about the appropriateness of audit. Aobdia (2019) concludes that three audit quality proxies (audit fees, meeting or beating the zero earnings benchmark and financial restatements) capture poor audit quality assessments of the practitioners. Aobdia (2019) utilises regulators (PCAOB inspections of deficient audits) and audit firms (internal assessments of audits conducted by the audit firms) as practitioners. Furthermore, Aobdia (2019) argues that in order to mitigate the weaknesses of ascertaining audit quality from PCAOB inspections, an audit quality proxy should also be associated with audit firms' internal assessments. Therefore, in line with DeFond and Zhang (2014), Aobdia (2019) suggests the practice of utilising multiple audit quality proxies to reduce Type 1 errors. In our context, Type 1 error, indicates that if a particular audit committee mechanism suggests better audit quality ascertained through a single proxy, then this result does not necessarily mean that the mechanism improves audit quality, as the association could be vulnerable to the audit quality proxy adopted. Hence, given that audit committees do not directly influence financial restatements as per Lai et al. (2017), adopting both audit fees and meeting or beating the zero earnings benchmark as audit quality proxies can be regarded as the most appropriate procedure for examining the link between female directors on audit committees and audit quality.

Prior studies (Aldamen et al., 2018; Ittonen et al., 2010; Lai et al., 2017) examining the link between female directors on audit committees and audit fees fail to adequately capture the practitioners' evaluation of audit quality as they do not utilise meeting or beating the zero earnings benchmark as an additional audit quality proxy. Further, present evidence on the relationship between female directors on audit committees and audit fees may have Type 1 errors. As a result, this study utilises both audit fees and the propensity to meet or beat the zero earnings benchmark as proxies of audit quality in the same study and provides a shred of convincing evidence that female directors on audit committee are positively associated with audit quality.

This chapter is structured as follows. Section 5.2 describes the prior literature and develops the hypothesis. Section 5.3 explains the methodology. Section 5.4 presents the empirical analysis and, lastly, section 5.5 concludes this chapter.

5.2 Hypothesis development

Given the inherently distinct characteristics of females such as taking into consideration the interests of others and being more ethical (Arun et al., 2015; Pucheta-Martínez et al., 2018; Smith & Oakley, 1997), they demonstrate a greater tendency to avoid any policies that could negatively affect the interests of shareholders. Previous studies such as Betz et al. (1989), Cohen et al. (1998) and Ruegger and King (1992) substantiate the higher ethical standards of females. Kaplan et al. (2009) evidence that females are more likely to disclose fraudulent financial reporting. As a result, female directors are likely to enhance audit quality, as this resonates with their quality of being more considerate of others. Hardies et al. (2015) and Ittonen and Peni (2012) evidence a positive link between female audit partners and audit fees.

Females also undertake less risks as compared to males (Byrnes et al., 1999; Zalata et al., 2018; Lai et al., 2017), which is likely to stem from the higher female life expectancy causing them to pursue less risks as then they will be safeguarded from any potential disadvantageous repercussions due to high risk strategies (Watson & McNaughton, 2007). Sundén and Surette (1998) find that females tend to select investment strategies of a low risk nature. Further, female directors are likely to perform their duties with more intensity because "they perceive their responsibilities as directors with higher expectations" (Ittonen & Peni, 2012; Pucheta-Martínez et al., 2016, p. 367). Additionally, as agents of the shareholders (Pucheta-Martínez et al., 2016), female directors are unlikely to tolerate any managerial policies that promote opportunism (Srinidhi et al., 2011; Zalata et al., 2018). Thus, they may monitor financial reporting policies more intensely and thereby increase audit quality. Lai et al. (2017) and Aldamen et al. (2018) find that female directors on audit committees are positively associated with audit fees.

Females may also enhance the quality of decisions (Ittonen et al., 2010; Srinidhi et al., 2011), as females are linked with the style of management that promotes cooperation and information sharing (Gul et al., 2013; Schminke & Ambrose, 1997; Smith & Oakley, 1997). Furthermore, females are likely to perform effectively in complex tasks (Gul et al., 2011), which is vital, as financial reporting tasks are complex (Mangena & Pike, 2005). This suggests that female directors are likely to be in a better position to analyse accounting choices and therefore enhance the extent of audit quality. Parker, Dao, Huang, and Yan (2017) find that female audit committee members are positively associated with greater likelihood in reporting internal control problems. Further, Srinidhi et al. (2011) substantiate the positive monitoring of female directors on audit committees in terms of lower discretionary accruals.

Based on the aforementioned discussion, the following hypothesis is presented:

H_1: Female directors on audit committees are positively associated with audit quality

5.3. Methodology

5.3.1. Sample

This study's focus on FTSE 350 index stems from greater availability of data and the inclusion of large as well as small firms (Lueg, et al., 2014; Zaman, et al., 2011). Further, the sample is expected to be representative of the study population (firms in the UK) because the FTSE 350 index encompasses around 97 percent of the UK market capitalisation and covers almost all of the industrial sectors in the UK (Haigh & Shapiro, 2012; Spyrou, Tsekrekos, & Siougle, 2011). Moreover, financial firms are not included in this study, as the regulatory and accounting framework of financial firms differs from non-financial firms (Ghafran & O'Sullivan, 2017; Zalata et al., 2018). Additionally, following Ghafran and O'Sullivan (2017), only the firms that were part of FTSE 350 index from 2009 to 2017 are included, as the UK Corporate Governance Code has a different set of principles for non-FTSE 350 index firms.

After taking into account the above information and missing data, the total firm-year observations are 761. This sample size is similar to other audit committee studies (for example, Aldamen et al., 2018 and Kusnadi, Leong, Suwardy, & Wang, 2016). Data for this study was collected from various sources. Corporate governance variables along with the information pertaining to the auditors' location and firms' subsidiaries were obtained from annual reports. Other firm characteristics were collected from the FAME database, however, we utilised the Osiris database for identifying industry dummies.

5.3.2 Audit quality

As discussed in the introduction section, we utilise two measure of audit quality, namely audit fees and meeting or beating the zero earnings benchmark. After assessing our research question by using audit fees, we examine our results in terms of meeting or beating the zero earnings benchmark.

Audit effort is likely to depict audit fees and, therefore, the higher the audit fees the higher the audit quality (Ghafran & O'Sullivan, 2017; Goodwin-Stewart & Kent, 2006). Further, utilising audit fee models may have less issues because of endogeneity, given the high R-square of these models (DeFond & Zhang, 2014). The following audit fee model (audit fee acts as a dependent variable) is adopted to test the association between female directors on audit committees and audit fees:

$$logaf = \beta_0 + \beta_1 acfp + \beta_2 acpid + \beta_3 acsize + \beta_4 acmeet + \beta_5 pfinexp + \beta_6 pind + \beta_7 lognaf + \beta_8 logta + \beta_9 pstock + \beta_{10} pdebt + \beta_{11} london + \beta_{12} logsub + \beta_{13} roa + IND + YE + \varepsilon$$

All the above variables are defined in Table 5.1. Female directors on audit committees are ascertained as the proportion of female directors on the audit committee (Gavious et al., 2012; Zalata et al., 2018). This study also adopts several control variables. Ghafran and O'Sullivan (2017) argue that they choose those control variables in their study which the UK research has

determined to be significant, as there is considerable literature on audit fees determinants. Therefore, we follow Ghafran and O'Sullivan (2017) in utilising control variables related to the audit fee model.

Given that the large size of the audit committee can be either effective due to a variety of directors' experiences (Zalata et al., 2018) or likely to cause the members to neglect responsibility (Kent & Stewart, 2008; Vafeas, 2005), we do not predict the direction of the link between audit committee size and audit fees. Moreover, due to the lack of familiarity of independent directors with management (Zaman et al., 2011), independent directors and audit committee independence are predicted to be positively associated with audit fees. Financial experts may also be effective, due to greater knowledge about financial reporting (Ghafran & O'Sullivan, 2017), and are expected to positively affect audit fees. Further, greater audit issues are likely to be identified with more audit committee meetings (Zaman et al., 2011) and thus expected to be positively associated with audit fees.

In relation to control variables pertaining to firm characteristics, given the analysts' scrutiny on large firms' performance, these firms may practice earnings manipulation (Chih, Shen & Kang, 2008) and thus are likely to have a positive association with audit fees due to the high audit risk. Moreover, the greater the complexity involved in the audit the higher the audit effort (Zaman et al., 2011), which may increase audit fees. Further, a higher proportion of receivables and inventory balances depict enhanced audit effort due to more balance confirmations and site visits respectively (Lai et al., 2017), translating into higher audit fees. Additionally, firm's poor profitability position is likely to be indicative of higher audit risk (Ghafran & O'Sullivan, 2017) so a negative association is predicted between profitability and audit fees. Furthermore, a positive association between London-based auditors and audit fees is predicted, as being in London entails a high living cost (Clatworthy & Peel, 2007). Also, as per Ezzamel, Gwilliam,

and Holland (1996), firms facing non-typical issues require non-audit services and also incur high audit fees. Thus, non-audit fees and audit fees are predicted to be positively associated.

The measurement of the control variables follows Ghafran and O'Sullivan (2017) and is defined as follows. Log of total assets, log of subsidiaries and log of non-audit fees are used to control for the impact of firm size, subsidiaries and non-audit fees respectively. Also, return on assets is utilised to control for performance, where return on assets is determined through the proportion of net income to total assets. Moreover, London-based auditor is ascertained as 1 if the auditor is based in London, otherwise 0. Proportion of inventory to total assets and proportion of debtors to total assets captures inventory balance and receivables balance respectively. Further, audit committee size is ascertained by the number of directors present on the audit committee, audit committee meetings are captured by the number of audit committee meetings held, proportion of financial experts on the audit committee determines financial expertise of the audit committee, audit committee independence is controlled through the proportion of independent directors on the audit committee and proportion of independent directors controls the representation of independent directors.

Following Ghafran and O'Sullivan (2017, p. 584), this study determines an audit committee member to be an accounting expert if he/she has held or currently holds an employment that is directly associated with accounting and auditing, which includes CPAs (Certified Public Accountants), CFOs, CAOs (Chief Accounting Officer), controllers and auditors while an individual is deemed as a non-accounting expert if he/she has held or currently holds an employment that involves investment banking, financial analysis role, any role involving financial management or a role that involves supervising financial statements such as CEO (Chief Executive Officer) or president of a company. Therefore, an audit committee member is considered as a financial expert if he/she is either an accounting expert or a non-accounting expert.

5.4 Results and discussion

5.4.1 Descriptive statistics and correlation analysis

Table 5.2 presents descriptive statistics. It shows that the average proportion of female directors on audit committees is around 21% in our sample. When compared to the value (12%) found by Zalata et al. (2018) in the US, it shows a greater presence of female directors on audit committees in the UK. This is likely to reflect the increasing pressure within the UK to increase female directors in companies (Department of Business, Innovation & Skills, 2011). Table 5.3 presents correlation matrix. It reveals a positive and significant correlation between female directors on audit committees and audit fees, however, this analysis does not control for other variables and, therefore, regression analysis presented below is a more appropriate procedure for answering our research question. Moreover, there are unlikely to be problems arising due to multicollinearity, as the variance inflation factor (VIF) values are all below 10 (Bose, Podder, & Biswas, `12017; Jackling & Johl, 2009).

Table 5.1 Variable definition

Variables	Definition
Dependent variable:	
Audit fees (*logaf*)	Log of audit fees
Main independent variables:	
Female directors on the audit committee (*acfp*)	Proportion of female directors on the audit committee
Female presence on the audit committee (*acfpr*)	1 if there is at least one female director on the audit committee otherwise 0
Control variables:	
Audit committee size (*acsize*)	Number of audit committee members
Audit committee meetings (*acmeet*)	Number of audit committee meetings
Financial experts on audit committee (*pfinexp*)	Proportion of financial experts on audit committee (defined in section 5.3)
Audit committee independence (*acpid*)	Proportion of independent directors on the audit committee
Board independence (*pind*)	Proportion of independent directors on the board
Firm size (*logta*)	Log of total assets
Inventory (*pstock*)	Proportion of stock to total assets
Receivables (*pdebt*)	Proportion of receivables to total assets
London-based auditor (*london*)	1 if the auditor is based in London otherwise 0
Complexity (*logsub*)	Log of subsidiaries
Profitability (*roa*)	Return on assets (proportion of net income to total assets)
Non-audit fees (*lognaf*)	Log of non-audit fees
Leverage (*lev*)	Proportion of liabilities to assets
Sales growth (*salegr*)	Annual sales growth
Market-to-book ratio (*mtbr*)	Proportion of market value of equity to book value of equity
Annual market price return (*returngr*)	Annual market price growth Industry effects
IND	Industry effects
YE	Year effects
Instruments for two-stage least squares regression:	
One-year lagged female directors on audit committee (*lacfp*)	One-year lagged proportion of female directors on the audit committee
Female-to-male participation rate (*prate*)	Proportion of female participation rate to male participation rate in a particular region

Table 5.2 Descriptive statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
logaf	7.140	1.320	1.099	10.589
acfp	0.218	0.187	0.000	1.000
acsize	3.957	1.065	2.000	8.000
acmeet	4.536	1.688	1.000	15.000
acpid	0.990	0.065	0.000	1.000
pfinexp	0.868	0.179	0.000	1.000
pind	0.564	0.109	0.000	0.857
lognaf	6.313	1.374	1.099	9.864
logta	15.073	1.463	12.140	19.621
pstock	0.124	0.176	0.000	0.928
pdebt	0.105	0.087	0.000	0.660
london	0.762	0.426	0.000	1.000
logsub	2.834	1.027	0.000	6.031
roa	0.083	0.106	-1.343	0.391

All variables are defined in Table 5.1.

Table 5.3 Correlation matrix

	logaf	acfp	acpid	acsize	acmeet	pfinexp	pind	lognaf	logta	pstock	pdebt	london	logsub	roa
logaf	1.000													
acfp	0.105*	1.000												
acpid	0.181*	0.068*	1.000											
acsize	0.262*	0.266*	0.028	1.000										
acmeet	0.409*	0.062*	0.104*	0.054	1.000									
pfinexp	0.152*	0.032	0.044	-0.014	0.215*	1.000								
pind	0.548*	0.171*	0.393*	0.337*	0.416*	0.158*	1.000							
lognaf	0.739*	-0.007	0.131*	0.198*	0.404*	0.104*	0.433*	1.000						
logta	0.753*	0.199*	0.110*	0.224*	0.476*	0.235*	0.522*	0.637*	1.000					
pstock	-0.327*	0.099*	0.043	-0.060*	-0.153*	-0.108*	-0.164*	-0.295*	-0.186*	1.000				
pdebt	0.115*	-0.131*	0.043	0.056	-0.082*	-0.012	-0.105*	-0.016	-0.266*	-0.129*	1.000			
london	0.349*	-0.025	0.102*	0.172*	0.200*	0.051	0.334*	0.327*	0.329*	0.008	-0.190*	1.000		
logsub	0.454*	-0.064*	0.158*	0.106*	0.141*	-0.039	0.224*	0.298*	0.215*	-0.282*	0.163*	0.100*	1.000	
roa	-0.084*	0.038	0.000	0.071*	-0.131*	-0.098*	-0.006	-0.080*	-0.123*	0.054	0.153*	-0.159*	0.128*	1.000

All variables are defined in Table 5.1. * $p<0.1$

5.4.2 Regression analysis

5.4.2.1 Audit fees

Due to the presence of firms in multiple years, issues arising from correlation in a particular firm's residuals over years (time-series dependence) and from correlation of a particular year's residuals over firms (cross-sectional dependence) may introduce bias in standard errors (Ghafran & O'Sullivan, 2017; Peterson. 2009). Therefore, following Zalata et al. (2018), we cluster standard errors at firm level and utilise year dummies to address time-series dependence and cross-sectional dependence, respectively.

Table 5.4 shows that female directors on audit committees are positively and significantly associated with audit fees. In line with Aldamen et al. (2018), we utilise another measure to determine female directors on audit committee. It involves a dummy methodology where the variable is 1 if the audit committee consists of at least one female director on the audit committee, otherwise 0. Table 5.5 reports that our findings are robust to an alternative definition of female directors on audit committees, as it still reports a positive and significant association with audit fees. However, before accepting or rejecting our hypothesis, this result will also have to be assessed by utilising the meeting or beating the zero earnings benchmark as an additional audit proxy.

Furthermore, several of our control variables (independent directors, extent of audit complexity, firm size, receivables, non-audit fees, firm performance and London-based auditors) are significant and are in line with the expectations.

Table 5.4 Ordinary least-squares regression (Audit fees)

acfp	0.502***
	(2.678)
acpid	0.064
	(0.137)
acsize	-0.019
	(-0.552)
acmeet	-0.014
	(-0.362)
pfinexp	-0.088
	(-0.433)
pind	1.135***
	(2.785)
lognaf	0.290***
	(4.628)
logta	0.491***
	(11.100)
pstock	-0.470
	(-1.520)
pdebt	2.929***
	(3.710)
london	0.225**
	(2.245)
logsub	0.212***
	(5.013)
roa	-0.625**
	(-2.032)
Constant	-3.701***
	(-5.555)
Observations	761
Adjusted R^2	0.827
Year effects	YES
Industry effects	YES
F Test	79.07***

This table reports the association between female directors on audit committees and audit fees. All standard errors are clustered at the firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in Table 5.1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 5.5 Robustness test (Alternative measure)

acfpr	0.196***
	(2.622)
acpid	0.133
	(0.283)
acsize	-0.031
	(-0.851)
acmeet	-0.011
	(-0.295)
pfinexp	-0.096
	(-0.473)
pind	1.099***
	(2.732)
lognaf	0.291***
	(4.638)
logta	0.492***
	(11.040)
pstock	-0.427
	(-1.371)
pdebt	2.957***
	(3.838)
london	0.235**
	(2.332)
logsub	0.211***
	(4.949)
roa	-0.557*
	(-1.838)
Constant	-3.775***
	(-5.548)
Observations	761
Adjusted R^2	0.820
Year effects	YES
Industry effects	YES
F Test	76.52***

This table reports the association between female directors on audit committees and audit fees using an alternative definition of female directors of audit committees. All standard errors are clustered at the firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in Table 5.1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

5.4.2.2 Meet or beat the zero earnings benchmark

As aforementioned, this study adopts a further audit quality proxy, namely meeting or beating the zero earnings benchmark. In order to avoid a dent in their market price due to the inability

to meet or beat the zero earnings benchmark, firms may manipulate earnings figure (Srinidhi et al., 2011; Tanyi & Smith, 2015). Thus, given that earnings just above zero are more likely to have been as a result of earnings manipulation rather than because of an actual change in firm performance (Srinidhi et al., 2011) and higher audit quality may curtail the extent of earnings management (Becker, DeFond, Jiambalvo, Subramanyam, 1998; Chen, Chen, Lobo, & Wang, 2011; Francis, Maydew, & Sparks, 1999), meeting or beating the zero earnings benchmark is expected to depict audit quality (DeFond and Zhang, 2014). This research, hence, discerns meeting or beating the zero earnings benchmark as 1 if return on assets is in the range of 0 to 0.05, otherwise 0, which is in line with Aobdia (2019), Francis and Yu (2009) and Tanyi and Smith (2015). Therefore, in this audit quality proxy, a negative association for female directors on audit committees is demonstrative of greater audit quality.

Control variables for this audit quality measure are as follows. Corporate governance control variables (audit committee independence, independent directors, audit committee size, financial expertise of the audit committee and audit committee meetings) adopted in this model are as per the audit fee model; however, the predicted direction is opposite to the direction expected in the audit fee model. Therefore, if independent directors were predicted to have a positive association with audit fees then in this audit quality proxy the association is expected to be negative, as a higher value in the meeting or beating zero earnings benchmark model indicates lower audit quality.

Following Arun et al. (2015), this study also adopts other control variables (firm growth, firm size and financial condition) related to firm characteristics. Pressure on large firms may cause them to manage earnings (Chih et al., 2008). Firms that perform poorly or are highly leveraged are likely to be in poor financial condition, prompting them to manage earnings (Ittonen et al., 2013; Zalata et al., 2018). Further, growing firms are not expected to be highly transparent, which may suggest that growing firms are likely to be associated with earnings manipulation

(Arun et al., 2015; Chih et al., 2008; Ittonen et al., 2013). Hence, a negative association is predicted between firm performance and propensity to meet or beat zero earnings benchmark, but a positive link is expected for firm's leverage, size and growth.

Log of total assets determines firm size, proportion of liabilities to assets ascertains leverage and firm growth is determined by annual growth in sales and market-to-book ratio (Arun et al., 2015). Performance of the firm is captured through annual market return in terms of share price (Srinidhi et al., 2011). The sample utilised in this case is the same as the one utilised in the audit fees model. Corporate governance data was hand collected. Further, Datastream was utilised for identifying the firm's market value and share price, while data pertaining to meet or beat the zero earnings benchmark and other financial characteristics were obtained from the FAME database.

Column 1 of Table 5.6 shows that there is a negative association between female directors on audit committees and meeting or beating the zero earnings benchmark. As a result, given our positive and significant association between female directors on audit committees and audit fees and the result in the meeting or beating the zero earnings benchmark model, this study's findings accept the hypothesis that the female directors on audit committees are positively associated with audit quality. Therefore, this points to the robustness and thus conclusiveness of the positive association between female directors on audit committees and audit quality. Applying a lower cut-off of 0-0.04 reduces the instances where the zero earnings benchmark has been surpassed or met from 243 to 190. However, we still apply this lower cut-off value, following Aobdia (2019) and Francis and Yu (2009), and find consistent results in Column 2 of Table 5.6. With regard to the control variables, we report that independent directors on audit committees, meetings of the audit committees, firm size and financial condition are significant and as per this study's expectations.

Table 5.6 Meet or beat the zero earnings benchmark

	Column 1	Column 2
acfp	-1.047***	-1.450***
	(-3.046)	(-4.124)
acpid	-3.070***	-3.510***
	(-2.724)	(-3.113)
acsize	-0.105*	-0.130**
	(-1.704)	(-2.163)
acmeet	-0.091**	-0.132***
	(-2.237)	(-3.325)
pfinexp	-0.332	-0.401
	(-1.014)	(-1.164)
pind	-0.033	0.466
	(-0.049)	(0.703)
logta	0.211***	0.227***
	(3.929)	(3.905)
returngr	-0.295*	-0.313*
	(-1.935)	(-1.657)
lev	0.645**	0.556*
	(2.031)	(1.762)
salegr	0.080	-0.186
	(0.312)	(-0.673)
mtbr	-0.002	-0.001
	(-1.108)	(-0.966)
Constant	0.135	0.409
	(0.105)	(0.321)
Observations	1,119	1,119
Pseudo R^2	0.138	0.155
Year effects	YES	YES
Industry effects	YES	YES
Wald test	98.05***	110.92***

Column 1 reports regression results for the association between female directors on audit committees on audit committees and the propensity to meet or beat the zero earnings benchmark (using the cut-off point of 0-0.05). Column 2 presents the robustness of the results in Column 1 with a different cut-off point of 0-0.04. All standard errors are clustered at the firm level. Reported results include *z*-statistics in parentheses along with coefficients. All variables are defined in Table 5.1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

5.4.3 Endogeneity

Although the above analysis suggests that the positive monitoring of female directors on audit committees in terms of audit fees is robust to meeting or beating the zero earnings benchmark, this study also utilises tools to mitigate the endogeneity bias involved in the association

between female directors on audit committees and audit quality. Therefore, this study adopts propensity score matching and two-stage least squares regression.

5.4.3.1 Propensity score matching

In order to apply the propensity score matching, we first ascertain the probability of including a female director on the audit committee. For this purpose, following Habib, Muhammadi, and Jiang (2017), Peel (2018) and Shipman, Swanquist, and Whited (2017), this study utilises all the control variables apart from our endogenous variable (female directors on audit committees). Further, as per Hardies et al. (2015), this procedure is in agreement with research on propensity score matching.

Afterwards, matched pairs, based on closest propensity (probability) scores identified in the first stage, are determined in which a pair consists of a firm with female presence on audit committee (treated firm) and a firm without the inclusion of a female director on audit committee (control firm) (Lai et al., 2017; Peel, 2018). We select matching with replacement (in this procedure each treated firm is matched once) in line with Shipman et al. (2017). Moreover, we apply a calliper distance of 0.01 (this applies a limit on the maximum difference between treated and control firms' predicted probabilities identified above), which may suggest greater quality in the matching process, as this encompasses more similarity between treated and control firms (Hooghiemestra, Hermes, Oxelheim, & Randøy, 2019; Gull et al., 2018). Our final step involves performing regression analysis on the matched sample (consisting of treated and control firms identified from the above mentioned matching process). Peel (2018, p. 175) contends that this is a more robust technique because "if either the matching or the parametric model is correct" then it will still result in a consistent estimate for the variable being researched.

Table 5.7 shows that treated and control firms are similar across the observable characteristics. This suggests appropriateness of the matching process, as it shows that any association between female directors on audit committees and audit fees is unlikely to stem from observable characteristics, given that our matching sample consists of firms that are similar across the observable characteristics (Habib et al., 2017; Peel, 2018). Table 5.8 reports a positive association between female directors on audit committees and audit fees and hence our finding could be considered to be robust to issues arising from endogeneity.

Table 5.7 Mean difference

	Treated	Control	*p*-value
acpid	0.994	0.995	0.827
acsize	3.537	3.592	0.495
acmeet	4.660	4.483	0.409
pfinexp	0.847	0.850	0.926
pind	0.565	0.556	0.451
lognaf	6.416	6.290	0.417
logta	15.000	14.891	0.509
pstock	0.133	0.132	0.986
pdebt	0.116	0.115	0.951
london	0.789	0.762	0.578
logsub	2.989	2.835	0.232
roa	0.072	0.080	0.632

Column 1 and 2 in this table shows the mean values of observable firm characteristics for treated (presence of a female directors on the audit committee) and control (without any presence of female directors on the audit committee) firms after nearest neighbour matching. Column 3 reports the *p*-values for the mean differences. All variables are defined in Table 1.

Table 5.8 Endogeneity test (Propensity score matching)

acfp	0.410**
	(2.076)
acpid	-0.878
	(-1.268)
acsize	-0.044
	(-0.800)
acmeet	0.018
	(0.688)
pfinexp	0.105
	(0.426)
pind	1.488***
	(2.813)
lognaf	0.175***
	(4.314)
logta	0.510***
	(10.290)
pstock	-0.807**
	(-2.531)
pdebt	3.086***
	(3.464)
london	0.252*
	(1.896)
logsub	0.242***
	(4.780)
roa	-0.836***
	(-3.379)
Constant	-2.702***
	(-3.023)
Observations	294
Adjusted R^2	0.859
Year effects	YES
Industry effects	YES
F Test	64.15***

This table reports the association between female directors on audit committees and audit fees after addressing the endogeneity bias using the propensity score matching. All standard errors are clustered at the firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in table 5.1. *** p <0.01, ** p <0.05, * p <0.1

5.4.3.2 Two-stage least squares regression

In order to successfully implement two-stage least squares regression, a variable (instrument) needs to be identified and such a variable should not be associated with the dependent variable (audit quality) but should be linked with audit quality. We utilise two instruments. First, the

lag of our endogenous variable (female directors on audit committees) is utilised, which is likely to be associated with the endogenous variable because corporate governance policies are unlikely to vary after these mechanisms have been adopted (Renders, Gaeremynck, & Sercu, 2010). Therefore, we adopt a one-year lag of female directors on audit committees and expect a positive association with female directors on audit committees (endogenous variable). Further, if female directors on audit committees are not endogenous (not associated with the error term, as ascertained through the Hausman test) then, due to the correlation of audit committee mechanisms over time, it is likely that the one-year lag will also be unrelated to the error terms and thereby valid (Bruynseels & Cardinaels, 2014). Second, following Zalata et al. (2018), this study utilises female to male participation rate in the region in which a given firm has its headquarters as a further instrument. More females in a particular region suggest a higher pool of potential candidates for a director's position (Chen, Leung, & Goergen, 2017; Zalata et al., 2018) and thus we predict a positive association between the female to male participation rate and female directors on audit committees. Also, according to Chen et al. (2017), it may be reasonable to suggest no association between female to male participation rate and audit quality, as there is no empirical evidence pointing to any such link. This participation rate was obtained from the Office for National Statistics while the Osiris database was utilised to collect data pertaining to the firms' headquarters.

First stage results of the two-stage least squares regression analysis are reported in Column 1 of Table 5.9. In line with our prediction, we find that a one-year lag of female directors on audit committees has a positive and significant association with female directors on audit committee. Although the link between female to male participation rate is in a positive direction as per our expectation, the relation is insignificant. However, other tests in Table 5.9 suggest that the instruments are valid and relevant. Cragg-Donald F-statistic of 288.953 is considerably greater than the critical value of 19.93, indicating that the instruments chosen are strong (highly related

to female directors on audit committee) (Chen et al., 2017; Hooghiemstra et al., 2019). Further, the significance of the Kleibergen-Paap test suggests that instruments are not under-identified (Habib et al., 2017; Hooghiemstra et al., 2019). In addition, the Hansen-*J* test is insignificant, therefore, the instruments can be considered as valid (unrelated to female directors on audit committees). Second-stage results in Column 2 of Table 5.9 find a positive and significant association with audit fees and hence our finding of a positive association between female directors on audit committees and audit quality is robust to endogeneity problems.

Table 5.9 Endogeneity test (Two-stage least square regression)

	Column 1	Column 2
acfp		0.728***
		(2.769)
lacfp	0.723***	
	(23.01)	
prate	0.297	
	(0.934)	
acpid	0.051	0.240
	(1.019)	(0.551)
acsize	0.016***	-0.017
	(3.468)	(-0.584)
acmeet	0.004	-0.020
	(1.217)	(-0.476)
pfinexp	-0.024	-0.105
	(-0.698)	(-0.556)
pind	0.057	1.060**
	(0.785)	(2.507)
lognaf	-0.005	0.261***
	(-0.984)	(4.333)
logta	0.001	0.507***
	(0.094)	(11.670)
pstock	0.069**	-0.611**
	(2.199)	(-2.043)
pdebt	-0.024	2.764***
	(-0.337)	(3.367)
london	-0.008	0.273***
	(-0.594)	(2.756)
logsub	-0.000	0.194***
	(-0.001)	(4.774)
roa	0.098*	-0.612*
	(1.678)	(-1.913)
Constant	-0.325	-3.814***
	(-1.156)	(-5.751)
Observations	652	652
Adjusted R^2	0.613	0.835
Year effects	YES	YES
Industry effects	YES	YES
F Test	65.47***	84.35***
Kleibergen-Paap test	*p*-value: 0.000	
Hansen-*J* test	*p*-value: 0.319	

This table reports the association between female directors on audit committees and audit fees after addressing the endogeneity bias. Column 1 shows the first-stage results of the two-stage least squares regression while the second-stage is reported in Column 2. All standard errors are clustered at the firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in table 5.1. *** p <0.01, ** p <0.05, * p <0.1

5.5 Conclusion

Corporate governance regulators' efforts to improve gender diversity in firms (Ali, Ng, & Kulik, 2014; Lai et al., 2017; Srinidhi et al., 2011; Terjesen & Sealy, 2016) indicate the importance of thoroughly examining whether female directors on audit committees improve audit quality. However, previous literature related to this aspect is not convincing, as studies fail to incorporate the practitioners' assessment of audit quality. Aobdia (2019) argues that it is important to consider the practitioners' views on audit quality, given that they possess more information about the audit and, hence, provide better judgment on audit quality.

Aobdia (2019) evidences that financial restatements, audit fees, and the propensity to meet or beat the zero earnings benchmark are associated with the practitioners' assessments of audit quality. Consistent with DeFond and Zhang (2014), Aobdia (2019), therefore, recommends the use of multiple audit quality proxies. Thus, as Lai et al. (2017) contend that financial restatements are not under the direct control of audit committees, audit fees and the propensity to meet or beat the zero earnings benchmark can be considered as the most suitable audit quality proxies when examining the effectiveness of audit committee characteristics in terms of audit quality. Given this argument, prior evidence investigating female directors on audit committees in terms of audit quality is unconvincing as no study utilises audit fees and meeting or beating the zero earnings benchmark in the same study.

This study's finding supports the results of previous studies (Aldamen et al., 2018; Lai et al., 2017) substantiating a positive association between female directors on audit committees and audit fees. Our study evidences that female directors on audit committees are positively and significantly associated with audit fees and also have a negative and significant relationship with meeting or beating the zero earnings benchmark. Therefore, this thesis provides a convincing evidence on the link between female director on the audit committee and audit quality.

Our finding indicate that firms may be able to increase their audit quality if female directors are present on audit committees. Moreover, this study is in congruence with policy-makers' steps to increase the representation of female directors. However, we caution that although multiple strategies are adopted to address endogeneity concerns, it is important to note that this issue may not have been fully addressed. Furthermore, this result is based on quantitative analysis, therefore, future research may complement this study's finding by conducting qualitative analysis.

Chapter 6: Female financial experts on audit committee and audit quality

6.1. Introduction

Empirical research evidences that the existence of female director enhances corporate disclosure (Ahmed, Monem, Delaney, & Ng, 2017), stock price (Ismail & Manaf, 2016), firm performance (Green & Homroy 2018), and earnings quality (Srinidhi, et al., 2011; Thiruvadi & Huang, 2011). Regulators consider female directors to be an important component of corporate governance mechanism, given the policies targeting the increase in female representation in companies. Countries such as Norway and Germany have enforced gender quotas (Lai et al., 2017; Terjesen & Sealy, 2016) while countries like the UK, Australia and the US have followed a softer approach where the firms are required to disclose their gender diversity policies (Ali et al., 2014; FRC, 2018). These policies are based on the idea that female directors may act as better monitors (Aldamen et al., 2018; Gull et al., 2018; Ittonen et al., 2010; Pucheta-Martínez et al., 2016), as they are more likely to show lower tolerance towards opportunistic behaviour (Srinidhi et al., 2011; Zalata, et al., 2018).

Applying the integrative (combining agency theory and resource dependence theory) theoretical framework of Hillman and Dalziel (2003) to female directors suggests that although agency theory may suggest enhanced oversight of female directors, the resource dependency theory points that this positive monitoring is driven by the various qualities possessed by female directors, indicating the need to incorporate specific skills and expertise of female directors on audit committees when examining their effectiveness. Further, Bennouri et al. (2018), Bravo and Alcaide-Ruiz (2019), Elmaghri et al. (2019) and Gull et al. (2018) highlight the importance of studying the medium that prompts the female directors to act as better monitors, as they evidence that female directors improve the oversight process only if they possess certain characteristics. In view of the above, we focus on the types of financial expertise

held by female audit committee members.

Financial expertise plays an important role in the effectiveness of audit committees and has been the focus of regulators such as the SEC and the UK Corporate Governance Code (Ghafran & O'Sullivan, 2017). This may stem from the contention that financial experts possess greater knowledge pertaining to financial statements (Tanyi & Smith, 2015). Regulators are, however, uncertain on the type of financial expertise considered most effective in monitoring financial reports. The SEC, at first, considered only accounting experts as financial experts but then concluded that both accounting experts and non-accounting financial experts can be considered appropriate for complying with the requirement to include a financial expert on an audit committee (Lee & Park, 2018). The current UK Corporate Governance Code also considers accounting and non-accounting financial experts acceptable to meet the requirement pertaining to including at least one member with recent and relevant financial experience on the audit committee, however, in 2015 the FRC did consider replacing this regulation to include at least one member with competency in accounting and/or auditing on the audit committee (FRC, 2015; Ghafran & O'Sullivan, 2017). It is pertinent to mention that both these regulators had to resort to broadening the definition of financial experts after receiving feedback from the stakeholders (FRC 2015; Ghafran & O'Sullivan, 2017; Lee & Park, 2018). In contrast, the European Union requires audit committees to consist of at least one director with accounting and/or auditing expertise (Abad & Bravo, 2018).

Empirical evidence is also mixed in this regard in the context of financial reporting. Some studies (Dhaliwal et al., 2010; Krishnan & Visvanathan, 2008; Krishnan & Visvanathan, 2009) find that only accounting experts on audit committees perform oversight function on audit committees while some (Ghafran & O'Sullivan, 2017; Goh, 2009; Badolato, et al., 2014) substantiate that only the monitoring of non-accounting experts on audit committee is effective. Despite this confusion around the definition of financial experts among the regulators and the

researchers, the prior literature (Ittonen et al., 2010; Zalata et al., 2018), however, does not distinguish between the types of female financial expertise. Hence, we empirically examine whether all types of female financial experts on audit committees offer similar monitoring capabilities, as this helps identify the characteristics driving the monitoring of female directors on audit committees. This is especially important given the recent evidence suggesting that the effectiveness of female directors depends on whether they possess specific attributes and thereby concludes all female directors may not be effective monitors.

Moreover, Bravo and Alcaide-Ruiz (2019) is the only study that studies the characteristics of female financial experts on audit committees, however, they examine the effectiveness of the types of female financial experts on audit committees in terms of forward-looking disclosures that do not form part of mandatory financial reports (they specify that they collect forward-looking disclosures from the voluntary section of annual reports). As a result, there is no study that examines whether different types of female financial experts on audit committees are effective in enhancing audit quality. Given that the credibility of financial reports is reliant on the quality of audit performed, it is critical to also consider the context of audit quality. Furthermore, Bravo and Alcaide-Ruiz (2019) did not divide the female non-accounting experts on audit committees further into supervisory and finance expertise. This segregation can offer deeper insights, as there are differing arguments pertaining to the effectiveness of supervisory and finance experts (for example, finance experts are typically in direct contact with management to know about various industrial issues facing firms and thus are in a better position to assess whether the firm's accounting reflects the substance of transactions (Dhaliwal et al., 2010; Barker, 1998).

To examine these characteristics, the UK offers an appropriate research setting. The litigation environment of the US is likely to be more stringent than the UK (Khurana & Raman, 2004; Wu et al., 2016), as Seetharaman et al. (2002) posit that class action suits are more prevalent

in the US. Therefore, the better monitoring efforts of audit committee mechanisms are unlikely to be attributed to a highly litigious environment if the study is conducted in the UK. Thus, Wu et al. (2016) contend that the UK context ensures the generalisability of the findings. Moreover, Ghafran and O'Sullivan (2017) indicate that the UK follows a comply or explain corporate governance regime. Hence, the UK context allows more variation in gender diversity practices, as the UK firms are not obligated to follow corporate governance policies.

This study contributes to the literature in several ways. First, it contributes to the audit quality literature, as it suggests the importance of considering the characteristics of female financial experts on audit committees (as opposed to the previous literature, which ignores the particular attributes of female financial experts on audit committees). Second, this study is the first to conclude that among the distinct types of female financial experts on audit committees, only members with accounting expertise are effective in improving the audit quality and, therefore, contributes to the mixed evidence (Ittonon et al., 2010; Zalata et al., 2018) on the effectiveness of female financial experts in terms of financial reporting oversight. Consequently, our findings suggests that the mixed evidence may have been because the prior literature did not segregate female financial experts into accounting and non-accounting expertise. Third, it furthers the research of Zalata et al. (2018), who recommend future researchers to divide broadly defined female financial experts on audit committees into accounting and non-accounting experts and then study their financial reporting monitoring.

Fourth, it attempts to offer valuable insights into the conflicting evidence on whether accounting or non-accounting experts on audit committee are effective monitors of financial reporting. As the recent studies evidence that female directors enhance monitoring but this is only when the female directors possess specific characteristics, our finding that only female accounting experts on audit committee act as effective monitors in terms of audit quality suggests that accounting experts on audit committees perform their monitoring function

effectively than non-accounting experts on audit committees. Lastly, it contributes to the literature identifying the particular attributes that improve the monitoring capabilities of female directors, as our study substantiates that female directors equipped with accounting expertise act as effective monitors in terms of enhancing audit quality.

The chapter is structured as follows. Section two develops hypotheses. Section three explains the methodology. Section four discusses the empirical results and, lastly, section five summarises and provides implications.

6.2 Hypotheses development

Agency theory indicates that managers adopt strategies against shareholders' interests to gain personal benefits; therefore, firms implement various monitoring mechanisms to oversee management (Aldamen et al., 2018; Rusmin, Scully, Tower, & Taplin, 2009). One such monitoring mechanism is external audit where auditors report the reliability of financial statements to shareholders (Lin & Hwang, 2010; O'Sullivan, 2000). However, whether a firm can attain high audit quality depends on how the corporation is governed (DeFond & Zhang, 2014; Rusmin et al., 2009).

Klein (2002, p.378) argues that audit committees regularly meet with the firm's management and auditors to review the corporation's financial statements and audit process. Moreover, according to Sun et al. (2011), audit committees are also responsible for resolving disputes between managers and auditors. Thus, audit committees are likely to complement auditors in overseeing managers (Aldamen et al., 2018; Ghafran & O'Sullivan, 2017). As a result, the composition of audit committees is expected to affect audit quality (Aldamen et al., 2018; Ghafran & O'Sullivan, 2013).

Women may demonstrate better communication skills (Pucheta-Martínez, et al., 2018; Zalata et al., 2018) and, hence, according to Ittonen et al. (2010), "perform better than men on group

problem-solving and decision-making tasks requiring discussion" (p.117). Also, Mangena and Tauringana (2008) contend that financial reporting matters are complex and, according to Terjesen, Couto, & Francisco (2016), women bring new viewpoints towards complex issues and thus improve problem-solving. Moreover, females are likely to prepare more thoroughly for meetings (Ittonen & Peni, 2012; Pucheta-Martínez et al., 2018). These arguments suggest that female directors improve the quality of decisions (Aldamen et al., 2018; Srinidhi et al., 2011; Zalata et al., 2018).

Females may be more sensitive to ethics (Lai et al., 2017; Krishnan & Parsons, 2008; Simga-Mugan, Daly, Onkal, & Kavut, 2005; Zalata et al., 2018), given that they are likely to be more considerate due to the distinct socialisation (Ibrahim, Angelidis, & Tomic, 2009; Lund, 2008; Owhoso, 2002; Srinidhi et al., 2011). Empirically, Bernardi et al. (2009) find that female directors are positively linked with the firm being regarded as ethical. Similarly, Bernardi and Arnold (1997) substantiate that female managers depict higher moral development than male managers. This suggests that female directors are not expected to be involved in manipulating financial reports for personal gains (Krishnan & Parsons, 2008; Srinidhi et al., 2011; Zalata et al., 2018).

Female directors are unlikely to be associated with any all-male network, which enhances independence (Adams & Ferreria, 2009; Srinidhi et al., 2011; Zalata et al., 2018). Therefore, women directors are likely to be placed in a better position to question the decisions of other directors (Lai et al., 2017; Srinidhi et al., 2011). Moreover, females may demonstrate less overconfidence (Huang & Kisgen, 2013; Ittonen & Peni, 2012) and are more likely to be risk-averse (Huang & Kisgen, 2013; Ittonen et al., 2013; Sila, Gonzalez, & Hagendorff, 2016). Therefore, female directors are expected to enhance the level of monitoring (Lai et al., 2017; Srinidhi et al., 2011). Empirically, studies show that female directors on audit committees are likely to modify audit opinion (Pucheta-Martínez et al., 2016), reduce earnings management

(Gavious et al., 2012; Gull et al., 2018; Srinidhi et al., 2011; Thiruvadi & Huang, 2011; Zalata et al., 2018) and increase audit fees (Aldamen et al., 2018; Lai et al., 2017).

However, agency theory is unlikely to be sufficient to explain a clear link between female directors and their impact on organisations (Carter et al., 2003; Gull et al., 2018). Theoretical framework proposed by Hillman and Dalziel (2003) suggests that it is important to consider both agency theory and resource dependence theory when examining directors' effectiveness. In support of this view, Bennouri et al. (2018), Bravo and Alcaide-Ruiz (2019), Gull et al. (2018) and Elmaghri et al. (2019) find that the organisational impact of female directors is contingent on whether they possess specific attributes.

Accounting experts are pivotal for the monitoring of financial reports, given the sophisticated accounting involved in the financial reports (DeFond et al., 2005; Dhaliwal et al., 2010; Kim et al., 2017). Therefore, members with accounting/auditing know-how are more likely to be in a better position to question managers and auditors (Dhaliwal et al., 2010) and review the management's response to the audit adjustments proposed by the auditors (DeFond et al., 2005). Similarly, Krishnan and Visvanathan (2008) posit that the competency of accounting experts enables them to evaluate provisions concerning warranties and lawsuits. Thus, they may be able to appropriately assess areas where judgments are involved (DeFond et al., 2005). McDaniel et al. (2002) find that among audit managers and graduates of Executive Master of Business Administration degrees, only the audit managers evaluated financial reporting under a framework aligned with the conceptual framework of the Financial Accounting Standards Board.

Further, accounting experts might be considered to have more responsibility for monitoring financial reports, given their enhanced accounting knowledge; hence, they could be exposed to greater reputational loss due to poor financial reporting (Kim et al., 2017). This may motivate

accounting experts to intensify the monitoring of financial reports. Lee and Park (2018) substantiate that accounting experts on audit committees restrict managers in manipulating the tone of the MD&A (management discussion and analysis) sections of financial reports. In addition, Schmidt and Wilkins (2013) report that accounting experts on audit committees reduce the time between identifying a financial restatement and disclosing the impact of the restatement.

Multiple studies provide evidence of the better monitoring capabilities of accounting experts on audit committees. Krishnan and Visvanathan (2008) find that accounting experts on audit committees are positively associated with accounting conservatism. Similarly, Dhaliwal et al. (2010) report that accounting experts on audit committees increase accruals quality. Further, DeFond et al. (2005) evidence that the appointment of accounting experts to audit committees leads to positive market reaction. In addition, Cohen et al. (2014) and Kim et al. (2017) report a positive association between the presence of accounting experts on audit committees and audit fees. As a result, we propose that female accounting experts on audit committees are likely to be positively associated with the monitoring of financial reports and thereby audit quality.

Hoitash et al. (2009) posit that non-accounting financial experts are less directly involved in financial reports. Thus, they may not have the requisite knowledge for monitoring financial reports (DeFond et al., 2005; Kim et al., 2017). As a result, non-accounting experts on audit committees may diminish the effectiveness of audit committees. Naiker and Sharma (2009) substantiate that firms with audit committee members with non-accounting expertise are more likely to experience internal control deficiencies. Krishnan and Visvanathan (2009) find that non-accounting experts on audit committees are insignificantly associated with audit fees. Similarly, Dhaliwal et al. (2010) and Krishnan and Visvanathan (2008) substantiate that non-accounting experts on audit committees are not associated with accruals quality.

However, Ghafran and O'Sullivan (2017) contend that non-accounting (finance and supervisory) financial experts may acknowledge their lack of accounting competency and demand extensive audit work. Also, they may possess relatively more industry knowledge, which can add value to audit committees' monitoring capacity (Dhaliwal et al., 2010). For example, industry knowledge may be crucial for appropriately assessing warranty provisions and having greater realisation of the need to conduct more audit work concerning complex revenue recognition in certain industries (Cohen et al., 2014).

Supervisory experts may improve financial reporting quality due to their experience in supervising individuals with financial reporting responsibilities (Naiker & Sharma, 2009, p. 567). Regarding finance expertise, Lee and Park (2018) suggest that they are competent in analysing financial reports because they may have developed the requisite skills to act as better monitors. Dhaliwal et al. (2010) also hold a similar viewpoint and contend that finance experts are competent in forecasting earnings and evaluating mergers and acquisitions, which enables them to possess greater knowledge about the wide range of factors affecting firms and thereby be in a better position to assess whether financial reports depict the actual situation. This suggests that non-accounting (finance and supervisory) financial experts on audit committees are likely to improve audit quality.

Ghafran and O'Sullivan (2017) report that non-accounting experts on audit committees increase audit fees. Further, Goh (2009) finds that supervisory expertise on audit committees is positively related to the timely remediation of internal control weaknesses. Moreover, Xie et al. (2003) evidence that investment bankers on audit committees reduce earnings management.

Due to the opposing views on the monitoring effectiveness of non-accounting experts on audit committees, we do not predict the direction of our hypotheses pertaining to non-accounting (finance and supervisory) experts.

H_2. Female accounting experts on audit committees are positively associated with audit quality.

H_3. Female finance experts (non-accounting financial experts) on audit committees are significantly associated with audit quality.

H_4. Female supervisory experts (non-accounting financial experts) on audit committees are significantly associated with audit quality.

6.3. Methodology

6.3.1. Sample

This study focuses on all non-financial firms on the FTSE 350 index from 2009 to 2017. The FTSE 350 index is chosen because it consists of large as well as small firms (Lueg et al., 2014; Zaman et al., 2011) and also because Lueg et al. (2014) contend that it ensures greater data availability. Non-financial firms are excluded because they have distinct regulatory and reporting requirements (Ghafran & O'Sullivan, 2017; Lueg et al., 2014; Zalata et al., 2018). As UK corporate governance regulation differentiates between firms on the FTSE 350 index and other firms listed in the UK given that it implements a less stringent requirement related to independent directors for non-FTSE 350 firms, only firms that were part of the FTSE 350 index from 2009 to 2017 are considered (Ghafran & O'Sullivan, 2017).

The restrictions above and missing information reduce the firm-year observations to 765 for the model related to female financial experts. The sample size is in line with other audit committee studies (Aldamen et al., 2018; Kusnadi et al., 2016). Corporate governance data were manually collected from annual reports. Regarding financial characteristics, data was collected from the FAME database except for the location of the auditor and subsidiaries. Auditor's location and the number of subsidiaries were obtained from annual reports.

Moreover, firms' annual reports were downloaded from their respective websites. In addition, GICS in the Osiris database was utilised for identifying the industry in which the firm operates.

6.3.2 Measurement of financial experts and audit quality

6.3.2.1 Types of financial expertise

Adopting Dhaliwal et al. (2010), Ghafran and O'Sullivan (2017, p. 584), Hsu, Moore, & Neubaum (2018) and Lee and Park (2018), this study segregates the financial expertise of the female audit committee members into three categories, namely accounting expertise (held or hold a position directly related to accounting and/or auditing, such as chartered accountants, chief financial officers, chief accounting officers, controllers and auditors), finance expertise (experience involving investment banking, financial analysis or any other position related to financial management) and supervisory expertise (chief executive officers and company presidents).

6.3.2.2 Audit quality

We utilise two measure of audit quality, namely audit fees and meeting or beating the zero earnings benchmark.

Aobdia (2019) argues that prior literature adopts a weak methodology to discern audit quality because they fail to consider practitioners' assessment of audit quality. It can be argued that those audit quality proxies which could capture the practitioners' evaluation of audit quality are likely to be strong measures to ascertain audit quality, given that the practitioners (regulators and audit firms) hold more information about the audit (Aobdia, 2019; Bell et al., 2015) and thus are in a more informed position to judge audit work. Aobdia (2019) finds that only three audit quality proxies, namely restatements, audit fees and meet or beat the zero earnings benchmark are associated with both practitioners' audit quality assessment. It is vital to consider both practitioners, as Aobdia (2019) contends that this helps address the weaknesses of only relying on the regulator (PACOB) assessment.

Lai et al. (2017), however, contend that audit committees do not have direct impact on restatements, therefore, this suggests that audit fees and meeting or beating the zero earnings benchmark could be regarded as strong proxies for ascertaining audit quality. Furthermore, adopting multiple proxies of audit quality limits Type 1 errors (where particular audit committee mechanism' association with audit quality may be contingent on a specific proxy utilised (Aobdia, 2019). Hence, this study, firstly, adopts audit fees and then assesses whether our findings are consistent with meeting or beating the zero earnings benchmark.

6.3.3 Audit fee model

Audit fees may determine the extent of audit effort and thereby audit quality (DeFond & Zhang, 2014; Ghafran & O'Sullivan, 2017; Goodwin-Stewart & Kent, 2006), as greater audit effort is positively linked with the detection of overstated earnings figures in analytical research (Caramanis & Lennox, 2008). Also, audit fee models have a very high R-square; hence, this may curtail endogeneity bias (DeFond & Zhang, 2014). The following audit fee model (audit fee is considered as a dependent variable) is adopted to test the three types of female financial experts on audit committees:

$$logaf = \beta_0 + \beta_1 pfemac + \beta_2 pfemf + \beta_3 pfemsup + \beta_4 pfemnonfin + \beta_5 acpid + \beta_6 acsize + \beta_7 acmeet + \beta_8 pind + \beta_9 lognaf + \beta_{10} logta + \beta_{11} pstock + \beta_{12} pdebt + \beta_{13} london + \beta_{14} logsub + \beta_{15} roa + IND + YE + \varepsilon$$

As per Ghafran and O'Sullivan (2017) and Lai et al. (2017), the log of audit fees captures audit fees. All the control variables in the audit fee models above are adopted from Ghafran and O'Sullivan (2017). They argue that there is a vast literature on the variables that could be associated with audit fees and thus they utilise the common audit fee determinants that the prior UK research has found to be statistically significant (p. 584). We also include several control variables. Zaman et al. (2011) argue that complex firms require greater audit effort because

they have less effective internal controls. Thus, complex firms are expected to be positively related to high audit fees. Chih et al. (2008) posit that large firms are under more pressure to manipulate financial reports given that analysts focus on their performance. Hence, large firms could be perceived by auditors as risky clients; therefore, a positive association is expected between large firms and audit fees. Moreover, Lai et al. (2017) contend that more receivables point to more balance confirmations while high inventory levels require greater site visits, leading to enhanced audit effort. Hence, high inventory balance and receivables are likely to be positively associated with audit fees. In line with Ghafran and O'Sullivan (2017), better profitability indicates less audit risk; thus, negative association is expected between return on assets and audit fees. As per Clatworthy and Peel (2007), auditors based in London charge high audit fees due to the higher living costs. Hence, London-based auditors are likely to be positively associated with audit fees. According to Ezzamel et al. (1996), firms with atypical issues have a greater need for non-audit services and also incur abnormally high audit fees. Therefore, a positive association between non-audit fees and audit fees is expected.

Independent directors may demand a higher monitoring effort in order to protect their reputation (Zaman et al., 2011) and thus independent directors and audit committee independence are predicted to have a positive association with audit fees. Following Ghafran and O'Sullivan (2017), both independent directors and audit committee independence are included. More audit committee meetings may help the members to be aware of greater audit issues (Zaman et al., 2011). Therefore, audit committee meetings are likely to be positively related to audit fees. Audit committees that are larger in size are likely to perform a better monitoring function due to more varied experience in the audit committee (Zalata et al., 2018); however, a large size could also lead to audit committees' tendency to shirk responsibility (Kent & Stewart, 2008; Vafeas, 2005). Hence, the sign of the association between audit

committee size and audit fees is not predicted. Industry effects and year effects are also controlled as per Lai et al. (2017).

Measurement of the control variables follows prior literature. Proportion of independent directors on the board (independent directors), number of audit committee members (audit committee size), number of audit committee meetings (audit committee meetings), proportion of independent directors on the audit committee (audit committee independence), log of number of subsidiaries (firm's complexity), log of total assets (firm size), proportion of inventories to total assets and proportion of receivables to total assets (inventory and receivables), return on assets (profitability), log of non-audit fees (non-audit fees) and dummy variable of 1 if the auditor is London-based otherwise 0 (London-based auditor) (Ghafran & O'Sullivan, 2017). Moreover, we also include female non-financial experts on audit committees as an additional variable in our model. Further, Zalata et al. (2018) find that only female financial experts act as better monitors, hence, our study does not include male financial experts. All the variables in the model are defined in Table 6.1.

6.4 Results and discussion

6.4.1 Descriptive statistics and correlation analysis

Table 6.2 presents descriptive statistics. It shows that the female accounting experts on audit committees comprise of 3.50 percent in our sample while non-accounting female financial experts constitute 14.01 percent of the audit committee members. When the non-accounting female experts are divided into finance and supervisory expertise, we find that the female audit committee members with finance and supervisory expertise comprise of 10 and 4.01 percent respectively in our sample. The average proportion of independent directors is around 0.6, indicating that firms seem to follow the UK corporate governance regulation which requires at least half of the board to be independent (Li, Pike, & Haniffa, 2008).

A correlation matrix is presented in Table 6.3. Despite the correlations amongst the independent variables, there are unlikely to be any severe multicollinearity concerns in our main audit fee regression models, given that the highest VIF value of 2.86 is lower than the critical value of 10 (Bose et al., 2017; Jackling & Johl, 2009).

Table 6.1 Variable definition

Variables	Definition
Dependent variable:	
Audit fees (*logaf*)	Log of audit fees
Main independent variables:	
Female accounting experts on the audit committee (*pfemac*)	Proportion of female accounting experts on the audit committee
Female non-accounting (finance) experts on the audit committee (*pfemf*)	Proportion of female non-accounting (finance) experts on the audit committee
Female non-accounting (supervisory) experts on the audit committee (*pfemsup*)	Proportion of female non-accounting (supervisory) experts on the audit committee
Control variables:	
Female non-financial experts on the audit committee (*pfemnonfin*)	Proportion of female non-financial experts on the audit committee
Audit committee size (*acsize*)	Number of audit committee members
Audit committee meetings (*acmeet*)	Number of audit committee meetings
Audit committee independence (*acpid*)	Proportion of independent directors on the audit committee
Board independence (*pind*)	Proportion of independent directors on the board
Firm size (*logta*)	Log of total assets
Inventory (*pstock*)	Proportion of stock to total assets
Receivables (*pdebt*)	Proportion of receivables to total assets
London-based auditor (*london*)	1 if the auditor is based in London otherwise 0
Complexity (*logsub*)	Log of subsidiaries
Profitability (*roa*)	Return on assets (proportion of net income to total assets)
Non-audit fees (*lognaf*)	Log of non-audit fees
Leverage (*lev*)	Proportion of liabilities to assets
Sales growth (*salegr*)	Annual sales growth
Market-to-book ratio (*mtbr*)	Proportion of market value of equity to book value of equity
Annual market price return (*returngr*)	Annual market price growth
IND	Industry effects
YE	Year effects

Instruments for two-stage least squares regression:	
One-year lagged female accounting experts on audit committee (*lpfemac*)	One-year lagged proportion of female accounting experts on the audit committee
Female-to-male participation rate (*prate*)	Proportion of female participation rate to male participation rate in a particular region

Table 6.2 Descriptive statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
logaf	7.140	1.317	1.099	10.589
pfemac	0.035	0.094	0.000	0.667
pfemf	0.100	0.143	0.000	0.500
pfemsup	0.041	0.098	0.000	0.400
pfemnonfin	0.042	0.101	0.000	0.500
acsize	3.961	1.065	2.000	8.000
acmeet	4.533	1.684	1.000	15.000
acpid	0.990	0.064	0.000	1.000
pind	0.564	0.109	0.000	0.857
lognaf	6.311	1.372	1.099	9.864
logta	15.071	1.461	12.140	19.621
pstock	0.124	0.175	0.000	0.928
pdebt	0.105	0.087	0.000	0.660
london	0.762	0.426	0.000	1.000
logsub	2.837	1.027	0.000	6.031
roa	0.082	0.105	-1.343	0.391

All variables are defined in Table 6.1.

Table 6.3 Correlation matrix

	logaf	pfemac	pfemf	pfemsup	pfemnonfin	acpid	acsize	acmeet	pind	lognaf	logta	pstock	pdebt	london	logsub	roa
logaf	1.000															
pfemac	0.069*	1.000														
pfemf	0.102*	-0.095*	1.000													
pfemsup	-0.003	-0.114*	-0.133*	1.000												
pfemnonfin	-0.073*	-0.028	-0.154*	-0.058*	1.000											
acpid	0.159*	0.026	0.041	0.062*	0.007	1.000										
acsize	0.267*	0.052*	0.168*	0.113*	0.101*	0.021	1.000									
acmeet	0.412*	0.048*	0.162*	-0.048*	-0.104*	0.010*	0.083*	1.000								
pind	0.509*	0.105*	0.131*	0.039	-0.052*	0.345*	0.338*	0.392*	1.000							
lognaf	0.728*	-0.027	0.045	-0.120*	-0.025	0.094*	0.207*	0.385*	0.403*	1.000						
logta	0.760*	0.017	0.185*	-0.008	-0.073*	0.112*	0.215*	0.430*	0.494*	0.647*	1.000					
pstock	-0.272*	0.078*	-0.015	-0.035	0.147*	0.036	-0.034	-0.143*	-0.133*	-0.257*	-0.163*	1.000				
pdebt	0.017	0.054*	-0.079*	0.003	0.031	0.037	0.074*	-0.034	-0.054*	-0.080*	-0.321*	-0.069*	1.000			
london	0.385*	0.063*	-0.094*	0.063*	-0.033	0.093*	0.184*	0.242*	0.307*	0.350*	0.379*	0.008	-0.182*	1.000		
logsub	0.466*	0.075*	0.009	-0.099*	-0.088*	0.146*	0.120*	0.149*	0.196*	0.271*	0.188*	-0.282*	0.227*	0.102*	1.000	
roa	-0.168*	0.051*	0.019	-0.065	0.076*	0.007	0.003	-0.081*	-0.01	-0.141*	-0.233*	0.070*	0.203*	-0.136*	0.085*	1.000

All variables are defined in Table 6.1. * $p<0.1$

6.4.2 Regression analysis

Given that firms in the sample are present in multiple years, time-series dependence may cause a particular firm's residuals to be correlated over the years (Peterson, 2009), which is likely to introduce bias in the standard errors (Ghafran & O'Sullivan, 2017). Following Ghafran and O'Sullivan (2017) and Hassanein and Hussainey (2015), this study addresses this problem by clustering the standard errors at the firm level. Also, cross-sectional dependence may lead to a particular year's residuals being correlated across firms (Peterson, 2009), which is addressed through introducing year dummies in line with Hassanein and Hussainey (2015).

Table 6.4 presents the association between the types of female financial experts and audit fees. It reveals that female accounting experts on audit committees are positively associated with audit fees. It also reveals a positive association between female non-accounting experts with supervisory expertise on audit committees and audit fees; however, we find no association between female non-accounting experts with finance expertise on audit committees and audit fees. Furthermore, we find an insignificant association between non-financial female experts on audit committees and audit fees. We also ascertain the robustness of our findings to another measure of determining female accounting and supervisory experts on audit committees. For this purpose, we utilise a dummy variable of 1 if there is at least one female audit committee member with accounting expertise, otherwise 0; same dummy measure is adopted for female non-accounting (supervisory) experts on audit committee. Table 6.5 reveals that our findings are also consistent with another proxy to ascertain female accounting and non-accounting (supervisory) experts on audit committees. However, in order to confirm our findings, they also need to be examined using the propensity to meet or beat the zero earnings benchmark as an additional audit quality proxy.

Consistent with Ghafran and O'Sullivan (2017) and with this study's expectations, the study finds that firm size, firm performance, audit complexity, receivables and proportion of

independent directors are significantly and positively associated with audit fees. The study also shows that both London-based auditors and non-audit fees are positively and significantly related to audit fees as predicted, which corroborates O'Sullivan (2000).

Table 6.4 Ordinary least-squares regression (Audit fees)

pfemac	0.790***
	(2.982)
pfemf	0.235
	(0.832)
pfemsup	0.827**
	(2.241)
pfemnonfin	0.339
	(0.975)
acpid	0.060
	(0.136)
acsize	-0.018
	(-0.515)
acmeet	-0.011
	(-0.303)
pind	1.106***
	(2.769)
lognaf	0.293***
	(4.734)
logta	0.494***
	(11.870)
pstock	-0.419
	(-1.348)
pdebt	2.881***
	(3.844)
london	0.192*
	(1.817)
logsub	0.217***
	(5.101)
roa	-0.568*
	(-1.888)
Constant	-3.879***
	(-5.849)
Observations	765
Adjusted R^2	0.820
Year effects	YES
Industry effects	YES
F Test	78.58***

This table presents regression results for the association between the proportion of types of female financial experts on audit committees and audit fees. All standard errors are clustered at the firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in Table 6.1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6.5 Robustness (Alternative definition)

dfemac	0.213***
	(2.667)
pfemf	0.244
	(0.870)
dfemsup	0.228**
	(2.419)
pfemnonfin	0.339
	(0.970)
acpid	0.063
	(0.142)
acsize	-0.032
	(-0.896)
acmeet	-0.009
	(-0.264)
pind	1.122***
	(2.790)
lognaf	0.291***
	(4.701)
logta	0.492***
	(11.660)
pstock	-0.431
	(-1.388)
pdebt	2.883***
	(3.845)
london	0.200*
	(1.887)
logsub	0.216***
	(5.064)
roa	-0.561*
	(-1.824)
Constant	-3.796***
	(-5.636)
Observations	765
Adjusted R^2	0.819
Year effects	YES
Industry effects	YES
F Test	78.98***

This table presents regression results for the association between the proportion of types of female financial experts on audit committees and audit fees utilizing an alternative definition of female accounting and non-accounting (supervisory) experts on audit committees (dummy variable method). All standard errors are clustered at the firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in Table 6.1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

6.4.3 Meet or beat the zero earnings benchmark

This study also utilises the propensity to meet or beat the zero earnings benchmark as an audit quality proxy. Firms may manipulate earnings to meet or beat the zero earnings benchmark in order to avoid a negative impact on their market value (Srinidhi et al., 2011; Tanyi & Smith, 2015). Graham et al. (2005) contend that if a firm is unable to meet the earnings benchmark, then the market perceives it as a sign of poor prospects and thus reduces the firm's market price. Therefore, according to Srinidhi et al. (2011), post-managed earnings of just above zero are likely to be linked to earnings manipulation rather than to an actual increase in performance. As the propensity to meet or beat the zero earnings benchmark is likely to depict earnings management (DeFond & Zhang, 2014; Srinidhi et al., 2011) and better auditing is expected to mitigate earnings management (Becker et al., 1998; Chen et al., 2011; Francis et al., 1999), DeFond and Zhang (2014) argue that meeting or beating the zero earnings benchmark captures audit quality. In line with Aobdia (2019), Francis and Yu (2009) and Tanyi and Smith (2015), propensity to meet or beat the zero earnings benchmark is ascertained as 1 if the return on assets is between 0 and 0.05, otherwise 0. Therefore, as the value of 1 is indicative of earnings manipulation, a negative sign in our main variables (female directors and the types of female financial experts on the audit committee) will suggest higher audit quality.

Control variables related to corporate governance are the same as in the audit fee model; however, the sign expected in meeting or beating the zero earnings benchmark model is opposite to what was expected in the audit fee model. For example, negative association is expected for audit committee independence in the meet or beat the zero earnings benchmark model as opposed to the positive sign expected in the audit fee model, as lower values in the meeting or beating the zero earnings benchmark variable are suggestive of better audit quality. This study adopts control variables for the financial characteristics (firm size, financial condition, and firm growth), in accordance with Arun et al. (2015). As large firms are under

greater pressure to perform, more earnings manipulation can be expected (Chih et al., 2008). Firms with either higher leverage or lower performance demonstrate poor financial condition and, hence, are more likely to manage earnings (Ittonen et al., 2013; Zalata et al., 2018). Ittonen et al. (2013) point out that growing firms are less transparent. Thus, growing firms are expected to be more prone to earnings management (Arun et al., 2015; Chih et al., 2008).

Following Arun et al. (2015), firm size is the natural log of total assets, leverage is ascertained as the proportion of total liabilities to total assets and growth is determined as annual growth in sales and as market-to-book ratio. Further, performance is ascertained as annual market return (Srinidhi et al., 2011). Data for meeting or beating the zero earnings benchmark was collected from the FAME database. Moreover, data related to corporate governance variables was obtained manually from annual reports. Further, except for market value of equity and annual market price return, which were collected from Datastream, all the remaining variables required to ascertain the financial characteristics were obtained from the FAME database. The sample for this measure is the same as that adopted for the audit fee model (see the Methodology section).

Column 1 of Table 6.6 reports that both female accounting experts and female non-accounting (finance) experts on audit committees are negatively associated with the propensity to meet or beat the zero earnings benchmark. As aforementioned, this negative sign depicts the positive association between the female accounting experts on audit committees and audit quality. It also evidences no significant association between female non-accounting experts with supervisory expertise on audit committees and meeting or beating the zero earnings benchmark. This suggests that only our finding of a significant and positive association between female accounting experts on audit committees and audit fees is robust to an alternative audit quality proxy. Thus, among the types of female financial experts on audit committees, only female accounting experts are positively associated with audit quality; therefore, hypothesis 2 is

supported while hypotheses 3 and 4 are not supported. This result is consistent with Bravo and Alcaide-Ruiz (2019), who find that only female accounting experts on audit committee are positively associated with forward-looking disclosures. Regarding the control variables, audit committee independence, audit committee meetings, firm size and firm's financial condition are significant and in line with our predictions.

We also follow Aobdia (2019) and Francis and Yu (2009) and employ another cut-off of 0 to 0.04. However, this lower cut-off value limits the occurrences where the zero earnings benchmark is met or nearly exceeded, as these instances fall from 246 to 192. Nevertheless, we find consistent results in Column 2 of Table 6.6.

Table 6.6 Meet or beat the zero earnings benchmark

	Column 1	Column 2
pfemac	-1.139*	-1.497***
	(-1.789)	(-2.586)
pfemf	-1.028**	-1.191**
	(-2.031)	(-2.211)
pfemsup	-0.610	-1.168*
	(-0.996)	(-1.658)
pfemnonfin	-1.178*	-1.951***
	(-1.827)	(-2.576)
acpid	-3.057***	-3.397***
	(-2.741)	(-3.141)
acsize	-0.090	-0.106*
	(-1.492)	(-1.810)
acmeet	-0.093**	-0.138***
	(-2.268)	(-3.451)
pind	-0.143	0.250
	(-0.210)	(0.373)
logta	0.203***	0.216***
	(3.748)	(3.653)
returngr	-0.257*	-0.249
	(-1.732)	(-1.376)
lev	0.648**	0.547*
	(2.040)	(1.740)
salegr	0.038	-0.229
	(0.148)	(-0.842)
mtbr	-0.002	-0.001
	(-1.060)	(-0.928)
Constant	0.086	0.300
	(0.067)	(0.236)
Observations	1,125	1,125
Pseudo R^2	0.136	0.150
Year effects	YES	YES
Industry effects	YES	YES
Wald test	100.21***	110.20***

Column 1 reports the association between the types of female financial experts on the audit committee and meeting or beating the zero earnings benchmark (using the cut-off point of 0-0.05). Column 2 presents the robustness of the results in Column 3 by using a different cut-off point of 0-0.04. All standard errors are clustered at the firm level. Reported results include *z*-statistics in parentheses along with coefficients. All variables are defined in Table 6.1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

6.4.4 Endogeneity

Although our finding related to the positive association between female accounting experts on audit committees and audit fees is robust to an alternative audit quality proxy, we are aware of

the possibility of endogeneity bias in our finding. Hence, we undertake two methods to mitigate the endogenous concerns, namely propensity score matching and instrumental regression (two-stage least-squares regression).

6.4.4.1 Propensity score matching

Firstly, following Chen et al. (2017), Habib et al. (2017), Hardies et al. (2015), Hooghiemstra et al. (2019), Peel (2018) and Shipman et al. (2017), all variables except the percentage of female accounting experts on the audit committee (the main variable in our case) are used to determine the probability to include female accounting experts on the audit committee. Hardies et al. (2015) contend that this approach is in line with the research on propensity score matching.

Secondly, matched pairs are ascertained, where a treated firm (with female accounting experts present on the audit committee) is matched with a control firm (without any female accounting experts present on the audit committee) with the closest propensity score to the treated firm (nearest neighbour matching) (Lai et al., 2017; Peel, 2018). In this step, the matching is performed without replacement, where control firms are matched to treated firms only once, as Shipman et al. (2017) posit that this procedure is common in accountancy research. Moreover, as per Gull et al. (2018) and Hooghiemstra et al. (2019), a calliper distance (the maximum difference in the propensity scores of treated and control firms) of 0.01 is also implemented to enhance the quality of the matching. Finally, regression is conducted on the matched sample; this last step, according to Peel (2018), addresses any remaining differences in observable characteristics between matched and control firms and also entails a doubly robust approach in which "if either the matching or the parametric model is correct, but not necessarily both, causal estimates will still be consistent" (p. 175).

Table 6.7 shows the similarity between the treated and control firms, given that no observable

firm characteristic is significant, thus suggesting successful matching (Habib et al., 2017; Peel, 2018). This shows that the treated and control firms are similar with respect to the firm characteristics observed, so any effect on the dependent variable (audit fees, in this case) arises due to the variable of interest (female accounting experts on audit committees, in this study) (Habib et al., 2017; Peel, 2018).

Table 6.8 presents the regression analysis on the matched sample and indicates that female accounting experts on audit committees are positively associated with audit fees. Overall, the results of the propensity score matching further strengthen our position that the finding related to female accounting experts is robust to endogeneity bias.

Table 6.7 Mean difference

	Treated	Control	*p*-value
pfemnonfin	0.039	0.047	0.579
acpid	0.992	0.973	0.184
acsize	4.306	4.367	0.722
acmeet	4.806	4.898	0.733
pind	0.603	0.596	0.669
lognaf	6.471	6.526	0.792
logta	15.462	15.532	0.759
pstock	0.131	0.143	0.642
pdebt	0.107	0.111	0.729
london	0.857	0.867	0.837
logsub	3.019	3.018	0.996
roa	0.089	0.088	0.871

Column 1 and 2 in this table shows the mean values of observable firm characteristics for treated (presence of a female accounting expert on the audit committee) and control (absence of a female accounting expert on the audit committee) firms after nearest neighbour matching. Column 3 reports the *p*-values for the mean differences. All variables are defined in Table 6.1.

Table 6.8 Propensity score matching (Endogeneity test)

pfemac	0.535*
	(1.963)
pfemnonfin	0.710*
	(1.845)
acpid	0.668
	(1.190)
acsize	0.0205
	(0.595)
acmeet	0.000
	(0.010)
pind	0.646
	(1.103)
lognaf	0.272***
	(4.206)
logta	0.539***
	(8.574)
pstock	-1.216***
	(-4.093)
pdebt	3.509***
	(6.140)
london	0.0887
	(0.647)
logsub	0.166***
	(3.473)
roa	-0.385
	(-0.706)
Constant	-4.200***
	(-4.085)
Observations	196
Adjusted R^2	0.910
Year effects	YES
Industry effects	YES
F Test	145.26***

This table presents the endogeneity test (applying regression on propensity score matched sample). All standard errors are clustered at the firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in table 6.1. *** p <0.01, ** p <0.05, * p <0.1

6.4.4.2 Two-stage least-squares regression

Firstly, two instruments are utilised for the endogenous variable (the proportion of female accounting experts on the audit committee (*pfemac*)), namely a one-year lag of *pfemac* and the female-to-male participation rate in the region where the firm is headquartered (*prate*). Given

that corporate governance policies are unlikely to change once implemented (Renders et al., 2010) and the evidence showing that audit committee characteristics are correlated over time (Bruynseels & Cardinaels, 2014), a one-year lag of *pfemac* (*lpfemac*) is likely to be positively associated with *pfemac*. In addition, a higher female-to-male participation rate is expected to be positively associated with *pfemac* (Chen et al., 2017; Zalata et al., 2018), as firms headquartered in a region where this rate is high are likely to have a greater female pool for selection (Chen et al., 2017). This rate was collected from the Office for National Statistics, and the data related to firms' headquarters was collected from the Osiris database. The arguments and evidence supporting the validity of these instruments are presented below. The Cragg–Donald F-statistic (546.691) in Table 6.9 suggests that the instruments are strong, as the value is much higher than 19.93 (this critical value of 19.93 is applied if two instruments are utilised to address the endogenous variable) (Chen et al., 2017; Hooghiemstra et al., 2019). Furthermore, according to Habib et al. (2017) and Hooghiemstra et al. (2019), the instruments are not under-identified due to the significance of the Kleibergen–Paap test in Table 6.8. Column 1 of Table 6.9 presents the first-stage regression results, showing that *lpfemac* is significantly and positively associated with *pfemac* (endogenous variable), in line with our expectations. It also reports that *prate* is positively associated with *pfemac* as per our prediction, however, this association is insignificant. The instruments, nevertheless, are highly relevant, given the criteria above. Our instruments are also valid. As the Hausman test for our endogenous variable (*pfemac)* is insignificant (p>0.10), we contend that *lpfemac* is a valid instrument (unrelated with error term) because if *pfemac* is unrelated with the error term then *lpfemac* is also unlikely to be correlated with the error term given the strong association between *pfemac* and *lpfemac* (Bruynseels & Cardinaels, 2014; Caramanis & Lennox, 2008). In addition, there is no reason to expect that *prate* affects audit fees (*logaf*) as there is no evidence suggesting any association between *logaf* and *prate* (Chen et al., 2017). Moreover, Table 6.9

indicates that the Hansen *J* test is insignificant, providing evidence that the instruments are valid (unrelated to the dependent variable (*logaf*)) (Ciftci, Tatoglu, Wood, Demirbag, & Zaim, 2019; Wintoki, Linck, & Netter, 2012).

Secondly, predicted values for *pfemac* are generated using ordinary least-squares regression, in which *pfemac* is regressed on the instruments and all other control variables (presented in Column 1 of Table 6.9) (Bruynseels & Cardinaels, 2014; Hooghiemstra, et al., 2019). Finally, in line with Caramanis & Lennox (2008), the predicted values replace our primary variable (*pfemac*) in the second-stage regression model (Column 2 of Table 6.9). The second-stage results show a significant and positive association between *pfemac* (here it represents the predicted values) and audit fees, which, according to Chen et al. (2017), suggests that our finding pertaining to the presence of female accounting experts on audit committees is robust to endogeneity concerns.

Table 6.9 Two-stage least squares regression (Endogeneity test)

	Column 1	Column 2
pfemac		0.927***
		(2.874)
lpfemac	0.898***	
	(27.63)	
prate	0.191	
	(1.231)	
pfemnonfin	-0.0327	0.292
	(-1.509)	(0.956)
acpid	-0.0119	0.439
	(-0.389)	(1.091)
acsize	0.00114	0.0113
	(0.455)	(0.364)
acmeet	0.00180	-0.0186
	(1.270)	(-0.469)
pind	0.0215	0.997**
	(0.737)	(2.459)
lognaf	-0.00369**	0.252***
	(-2.112)	(4.201)
logta	-0.00129	0.524***
	(-0.530)	(12.07)
pstock	0.0226	-0.586**
	(1.559)	(-1.989)
pdebt	0.0263	2.633***
	(1.030)	(3.502)
london	0.0104*	0.207**
	(1.719)	(1.991)
logsub	0.00319*	0.191***
	(1.815)	(4.683)
roa	0.0284	-0.607*
	(1.344)	(-1.762)
Constant	-0.134	-4.285***
	(-1.057)	(-6.301)
Observations	654	654
Adjusted R^2	0.656	0.832
Year effects	YES	YES
Industry effects	YES	YES
F Test	89.17***	76.23***
Kleibergen-Paap test	*p*-value: 0.000	
Hansen-*J* test	*p*-value: 0.524	
Cragg-Donald F-statistic	541.887 (Critical value: 19.930)	

This table presents the endogeneity tests. Column 1 presents the first-stage results for the two-stage least squares regression, while Column 2 reports the second-stage. All standard errors are clustered at the firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in table 6.1. *** p <0.01, ** p <0.05, * p <0.1

6.5 Conclusion

Prior literature (Ittonen et al., 2010; Zalata et al., 2018) examining female financial experts on audit committees and audit quality assumes that all female directors have the same monitoring capabilities to improve audit quality. The recent evidence finds that this is unlikely to be the case, as it suggests that the monitoring capability of female directors is driven by specific characteristics possessed by the female directors. Consequently, these researchers recommend regulators to incorporate female directors' characteristics when implementing policies to increase the number of female directors.

This study, hence, examines the association between the types of financial expertise held by female audit committee members and audit quality. Apart from the importance attached to the inclusion of financial experts on audit committees in terms of enhanced financial knowledge positively contributing towards the monitoring of financial reports (Tanyi & Smith, 2015), our motivation for studying financial expertise stems from the regulators' and the researchers' confusion around the definition of what constitutes a financial expert.

We apply the theoretical framework proposed by Hillman and Dalziel (2003) and the proposition of Gull et al. (2018) and Bennouri et al. (2018) and examine the distinct types of financial expertise possessed by female audit committee members. Our study's findings reveal that only female accounting experts can be considered as effective monitors, as we find that only the accounting expertise held by female audit committee members is associated with higher audit quality in terms of higher audit fees and a lower likelihood of meeting or beating the zero earnings benchmark. As it has been argued that if an audit committee mechanism is positively associated with audit fees and negatively linked with the propensity to meet or beat the zero earnings benchmark, then it is considered to be positively linked with audit quality. In view of this, female non-accounting (supervisory) experts on audit committees are not significantly associated with meeting or beating the zero earnings benchmark, while female

non-accounting (finance) experts are insignificantly associated with audit fees. Therefore, female non-accounting experts on audit committees are not associated with audit quality.

These results support the findings of Bravo and Alcaide-Ruiz (2019). In contrast with this study's context of audit quality, they utilise voluntary forward-looking disclosures and evidence that female accounting experts on audit committees are positively associated with forward-looking disclosures, while female non-accounting experts on audit committees are insignificantly linked with forward-looking disclosures.

Our study offers pertinent implications. To the extent that firms aim to improve the monitoring of financial reports, the inclusion of female financial experts on audit committees with accounting expertise, rather than non-accounting (finance and supervisory) expertise, provides a potential medium for firms to attain this aim. Also, our findings do not support the current regulatory regime that ignores the specific characteristics of female directors when focusing on female directors. Further, this study supports the efforts of the regulators to regard accounting expertise of audit committee members as the only category to satisfy the requirement about the presence of a financial expert on the audit committee.

Our study has a few limitations. Despite using multiple methodologies to mitigate the endogenous bias, we acknowledge that endogeneity might not have been completely addressed. Moreover, qualitative analysis is not conducted to assess the strength of our findings; therefore, this can be considered a fruitful avenue for future research to confirm our findings.

Chapter 7: Female public accounting and CFO experts on audit committee and audit quality

7.1. Introduction

This research investigates the association between expertise of female audit committee directors and audit quality. Several legislators have introduced policies aimed at increasing female directors (Lai et al., 2017; Terjesen & Sealy, 2016) as they are likely to depict lower tendency to tolerate managerial opportunism (Zalata et al., 2018). However, the regulators' efforts to increase female directors are based on the contention that each female director possess equal monitoring effectiveness. We contend that this may not be the case given the recent evidence (Gull et al., 2018; Bennouri et al., 2018) suggesting that the monitoring effectiveness of female directors depends on whether they possess specific attributes. Therefore, the importance of empirically identifying the characteristics that drive the monitoring of female directors motivates us to examine female public accounting and CFO experts on audit committees in terms of audit quality.

Audit committees are responsible for the oversight of financial reports (Cohen et al., 2014; Zalata et al., 2018) and thereby may curtail agency costs (derived from the separation of managers and owners) pertaining to manipulation of financial reports (Dhaliwal et al., 2010; Zalata et al., 2018). One of the audit committee mechanisms that has received attention from academics and regulators is accounting expertise of audit committee members. From the regulatory point of view, in the UK, the FRC recently initiated efforts to change the regulation of requiring at least one director with "recent and relevant financial experience" on audit committee to at least one audit committee member with competency in accounting/auditing (Ghafran & O'Sullivan, 2017, p. 580). This may originate from the better capability of accounting experts to handle the sophistication involved in accounting (DeFond et al., 2005; Dhaliwal et al., 2010). Therefore, as Bédard and Gendron (2010) consider that audit quality

ascertains audit committee effectiveness, it can be argued that female audit committee members with accounting expertise are likely to improve audit quality.

Hillman and Dalziel (2003) present a theoretical framework that incorporates both agency theory and resource dependence theory. In our context, it suggests that while agency theory may point to the positive oversight of female directors due to their enhanced independence from management (Zalata et al., 2018), incorporating the resource dependency theory suggests that considering female directors' skills and expertise may be necessary for their impact on financial reporting monitoring.

Therefore, although audit committee accounting experts with public accounting expertise may be useful given their higher accounting knowledge and risk-averse attitude (Abernathy et al., 2014; Hoitash et al., 2016), the effectiveness of accounting expertise derived from holding the role of CFO may be questionable. This may be because the role of CFOs has shifted from accountancy to strategy and managing relations with investors (Abernathy et al., 2014; Aier et al., 2005), which is likely to cause them to be deficient in accounting knowledge (Aier et al., 2005). In contrast, given that the responsibility for financial reports rests with CFOs (Billings et al., 2014; Jiang et al., 2010), they are likely to possess technical know-how of accountancy. Previous literature, however, neither examines female public accounting experts nor assesses female CFO experts on audit committees in terms of audit quality. Audit quality entails special importance as it points to the reliability of financial reporting, "which improves resource allocation and contracting efficiency" (DeFond & Zhang, 2014, p. 275). Moreover, "growing complexity of business transactions and accounting standards increases auditing's potential to add value" (DeFond & Zhang, 2014, p. 275).

In order to examine these attributes of female accounting experts on audit committees, the UK offers a suitable research setting to conduct our study. As compared to the US, the UK is likely

to have a lower litigation risk (Khurana & Raman, 2004; Wu et al., 2016), given that Brennan and McGrath (2007) and Seetharaman et al. (2002) argue that the presence of class action suits is greater in the US. The greater likelihood of being sued by investors for poor financial reporting (Brochet & Srinivasan, 2014) may motivate the audit committee members to intensify the monitoring efforts (Cohen, Krishnamoorthy, & Wright, 2010; Brennan & McGrath, 2007). Therefore, we argue that any findings of positive monitoring effectiveness of audit committee mechanisms in the UK are less likely to be attributed to higher litigation risk for audit committee members. This is in line with Wu et al. (2016), who contend that the UK context allows the findings to be more generalisable.

After utilising non-financial FTSE 350 index firms from 2009 to 2017, we find that female accounting experts on audit committees with public accounting expertise are positively associated with audit quality. Our study adopts multiple audit quality proxies to enhance the robustness of our findings. We utilise audit fees and the propensity to meet or beat zero earnings benchmark as audit quality proxies, as, following Aobdia (2019) and Lai et al. (2017), these proxies can be considered as more potent in the context of audit committee (section 7.3.3 provides a detailed explanation). Further, this finding is robust to endogeneity bias addressed through two-stage least square regression and propensity score matching. Moreover, we find no association between CFO expertise of female accounting experts on audit committee and audit quality.

This study adds to the literature in multiple ways. First, it contributes to the auditing and audit committee accounting expertise literature, as, to the best of our knowledge, this is the first study to find that among public accounting expertise and CFO expertise of female accounting experts on audit committee, only those with public accounting expertise are positively associated with audit quality. Second, our finding related to monitoring effectiveness of public accounting expertise of female audit committee members adds to the recent literature (Bennouri et al.,

2018; Bravo & Alcaide-Ruiz, 2019; Elmaghri et al., 2019; Gull et al., 2018) identifying specific attributes having a positive influence on female directors' monitoring effectiveness. Third, we contribute to the literature (Zalata et al., 2018) finding that female financial experts on audit committees positively influence financial reporting oversight, as we suggest that certain female financial experts may not be effective monitors.

The remaining chapter is organised as follows. In section two, we develop the hypotheses. Section three details the research methodology. Section four discusses the results and section five concludes the study.

7.2 Hypotheses development

Female directors may make better decisions (Zalata et al., 2018), given that they are likely to exhibit better communication ability (Ittonen, et al., 2010). Also, female directors may induce diversity, which can cause the gender-diverse audit committee to raise questions that an all-male audit committee may not ask (Carter et al., 2003). Empirical research (Gavious et al., 2012; Gull et al., 2018; Srinidhi et al., 2011; Thiruvadi & Huang, 2011; Zalata et al., 2018) also evidences that female presence on audit committee reduces earnings management. Hence, female directors are more equipped to monitor managerial opportunism and thereby lead to higher audit quality.

Female directors are likely to be ethically sensitive due to the inherent variations in the personalities of men and women (Pucheta-Martínez et al., 2018) and thus may exhibit lower propensity to accept opportunistic behaviour (Srinidhi et al., 2011; Zalata et al., 2018). Bernardi et al. (2009) substantiate that female directors' representation is positively associated with being listed among the world's most ethical firms. Moreover, female directors may be more independent in financial reporting oversight, as they are unlikely to be linked with any all-male networks (Srinidhi et al., 2011; Zalata et al., 2018). Aldamen et al. (2018) and Lai et al. (2017)

find that female presence on audit committee enhances audit fees. This may suggest the enhanced monitoring effort of the gender-diverse audit committee (Lai et al., 2017).

Aier et al. (2005) observe that CFOs with public accounting expertise in the US firms constituted 20 percent while those with a background of MBA (Master of Business Administration) comprised of 35 percent. Hoitash et al. (2016) and Murphy (2013) also note the falling trend of hiring CFOs with public accounting expertise. This may suggest firms' lack of focus on the accounting knowledge of CFOs (Abernathy et al., 2014). PCAOB's chief auditor states that CFOs are now valued more for their capability to generate finance than the accounting knowledge (Aier et al., 2005). Further, the present CFO plays an important role in strategy, information technology projects, concentrating on complex deals to improve performance and managing relationships with investors (Abernathy et al., 2014; Aier et al., 2005). Kwoh (2012) reports that the position of COOs whose responsibilities involve operations and strategy are being transferred to CFOs. As a result, Aier et al. (2005) contend that the change in the role of CFOs may cause their accounting skills to subside and thus lead to greater financial reporting errors. Abernathy et al. (2014) find an insignificant association between audit committee accounting experts with CFO expertise and financial reporting timeliness. Similarly, Naiker and Sharma (2009) evidence an insignificant association between audit committee members with potential accountancy expertise (they include CFOs in this category) and internal control weaknesses.

On the other hand, as the responsibility related to financial reports rests with CFOs (Jiang et al., 2010; Billings et al., 2014), they are likely to be "most directly involved in accounting choices" (Ge et al., 2011, p. 1142). This suggests that audit committee members with experience as CFO may be technically competent in relation to accounting issues and thereby capable in improving audit quality. Previous empirical evidence (Barua, Davidson, Rama, & Thiruvadi, 2010; Liu, Wei, & Xie, 2016; Peni & Vähämaa, 2010) also finds that CFOs are

associated with financial reporting. Furthermore, in the context of audit committee, Lisic et al. (2019) substantiate that when the category of accounting experts on audit committees includes directors with CFO experience, then this results in a positive association between audit committee accounting expertise and reporting of adverse internal control opinion.

Further, CFOs with public accounting expertise are likely to have greater technical knowledge about accounting, leading to a better understanding of accounting policies and ambiguous transactions (Abernathy et al., 2014). Also, CPAs (who fall under the category of public accounting experts) are likely to be risk-averse (Hoitash et al., 2016), which may intensify the monitoring of financial reports (Lai et al., 2017). Moreover, CPAs may perceive greater legal liability associated with poor financial reporting (Ge et al., 2011), leading to enhanced monitoring. As a result, audit committee members view directors with public accounting expertise as an integral component in carrying out audit committee duties (Abernathy et al., 2014).

DeZoort et al. (2008) evidence that public accounting experts show greater support for the adjustments proposed by the auditor. Sun et al. (2015) substantiate that stakeholders are more content with the firm' corporate governance if CFOs are CPAs. Similarly, Li, Sun, and Ettredge (2010) report that CFOs with public accounting expertise reduce the likelihood of weak internal controls. Further, Rakhman (2009) shows that CPAs are associated with higher earnings informativeness.

Although we predict a positive association between female public accounting experts on audit committees and audit quality, we do not propose a direction in the association between female CFO experts on audit committees and audit quality.

> *H_5: Public accounting expertise of female directors on audit committees is positively associated with audit quality.*

H_6: CFO expertise of female audit committee members is significantly associated with audit quality.

7.3 Data and methodology

7.3.1 Sample

Our sample comprises of non-financial firms on the FTSE 350 index from 2009 to 2017. We perform the following steps to arrive at our final sample. Firstly, all non-financial firms on the FTSE 350 index are identified as of December 2017. FTSE 350 index includes both large and small firms (Lueg et al., 2014; Zaman et al., 2011) and may ensure greater availability of data (Lueg et al., 2014). Also, we exclude financial firms due to the different reporting framework of these firms (Cohen et al., 2014; Ghafran & O'Sullivan, 2017). Secondly, only the firms which were continuously part of the FTSE 350 index from 2009 to 2017 were retained. This step follows Ghafran and O'Sullivan (2017) who point that the UK corporate governance code distinguishes between FTSE 350 firms and other listed firm, for example, the code requires greater presence of independent directors on FTSE 350 firms in comparison to other listed firms.

All of the above variables are defined in Table 7.1. After considering the missing data, the sample for our audit fee model comprises of 765 firm-year observations. The size of our sample is similar to other audit committee studies such as Aldamen et al. (2018) and Kusnadi et al. (2016). Data related to corporate governance was hand collected from the annual reports obtained from the company websites. Auditor's location and firm's subsidiaries were also manually collected from the annual reports while all other financial characteristics' data was obtained from the FAME database. GICS classification from the Osiris database was utilised to incorporate industry dummies.

7.3.2 Determining public accounting and CFO expertise of female directors on audit committees

Female directors with public accounting expertise on audit committees are ascertained as the percentage of female directors who hold professional accountancy qualification and/or public accounting experience (Abernathy et al., 2014). Directors who have been or are associated with auditing and accounting services in the public accountancy firms are considered to possess public accounting experience. CFO expertise of female directors on audit committees is ascertained as the proportion of female directors with CFO experience, which is in line with Engel, Hayes, and Wang (2010), who do not consider CFO experience as accounting expertise.

7.3.3 Audit quality

Aobdia (2019) contends that academics' audit quality proxies are weak to ascertain audit quality because they fail to capture the unobservable audit procedures. Thus, it is essential to assess audit quality from the practitioners' view, given that they possess detailed information about the audit conducted (Aobdia, 2019; Bell et al., 2015). Among the various audit quality measures adopted by prior researchers, Aobdia (2019) finds that only audit fees, meeting or beating the zero earnings benchmark and financial restatements are associated with practitioners' assessment of audit quality. Aobdia (2019) utilises both PCAOB and audit firms' internal inspections as surrogates for practitioners. He argues that for a particular measure to capture practitioners' assessment of audit quality it needs to be associated with both PCAOB and internal inspections, as this attenuates any weaknesses involved in PACOB's inspections. Hence, as per DeFond and Zhang (2014), he recommends adopting multiple proxies of audit quality as this approach reduces type 1 errors. In the context of this study, type 1 error would mean that if a particular audit committee mechanism is related to only a single audit quality proxy, then it induces type 1 error and thereby limits the robustness of the finding.

In this study, audit quality is ascertained through audit fees and meeting or beating the zero earnings benchmark. Firstly, audit fees are utilised as an audit quality proxy. Secondly, the results' sensitivity is assessed by measuring audit quality through the propensity to meet or beat the zero earnings benchmark.

Audit fees are likely to capture audit effort and thus audit quality (DeFond & Zhang, 2014; Ghafran & O'Sullivan, 2017; Goodwin-Stewart & Kent, 2006), given that analytical research suggests that higher audit effort leads to greater likelihood in detecting manipulated earnings (Caramanis & Lennox, 2008). Further, audit fee models mitigate endogeneity concerns due to their high R-squares (DeFond & Zhang, 2014). The following audit fee model (where the dependent variable is audit fee) is adopted to examine our hypotheses:

$$logaf = \beta_0 + \beta_1 pfempub + \beta_2 pfemcfo + \beta_3 pfemrem + \beta_4 acsize + \beta_5 acmeet + \beta_6 acpind + \beta_7 pind + \beta_8 lognaf + \beta_9 logta + \beta_{10} pstock + \beta_{11} pdebt + \beta_{12} london + \beta_{13} logsub + \beta_{14} roa + IND + YE + \varepsilon$$

We consider several control variables. We use the recent study by Ghafran and O'Sullivan (2017) to utilise the control variables for our audit fee model. They contend that there is extensive literature on determinants of audit fees and thus utilise only those variables that the previous UK empirical research has ascertained to be significant. Although higher audit committee size may be beneficial in terms of questioning management due to distinct experiences of the members (Zalata et al., 2018), it may also create a tendency among the members to avoid undertaking responsibility (Kent & Stewart, 2008; Vafeas, 2005). Hence, the sign of the association between audit committee size and audit fees is not predicted. Also, more audit committee meetings are likely to apprise the members of more audit issues (Zaman et al., 2011) thus they are expected to be positively associated with audit fees. Independent directors are likely to perform better monitoring function due to their lack of association with

the management (Zaman et al., 2011). Hence, both independent directors and audit committee independence are also controlled (Ghafran & O'Sullivan, 2017) and are predicted to have a positive association with audit fees. We also control for the other female directors on audit committee who are neither public accounting experts nor CFO experts. This is likely to have a positive association with audit fees given the prior evidence (Lai et al., 2017; Aldamen et al., 2018) finding that female directors on audit committees increase audit fees.

Extensive auditing may be required in the case of large firms (Lai et al., 2017), as these firms' performance is scrutinised by analysts and thus are likely to be under pressure to manage earnings (Chih et al., 2008). We also include complex firms, as they are likely to have poor internal controls and thus require enhanced audit work (Zaman et al., 2011). Moreover, higher inventory and receivables may require more site visits and confirmations from debtors, respectively (Lai et al., 2017); thus, both inventories and receivables are also included. Thus, firm size, complexity, inventories and receivables are predicted to be positively associated with audit fees. Also, as per Clatworthy and Peel (2007), London may be linked with greater cost of living. Further, firms with unusual issues may need greater non-audit fees and greater auditing (Ezzamel et al., 1996). Therefore, London-based auditors and non-audit fees are expected to be positively linked with audit fees. Moreover, higher firm performance may reflect less audit risk (Ghafran & O'Sullivan, 2017), so a negative association between firm performance and audit fees is predicted.

Control variables are determined as follows. Audit committee size (total number of directors present on the audit committee), audit committee meetings (number of audit committee meetings held annually), independent directors (proportion of independent directors to total directors on the board), independence of audit committee (proportion of independent directors on audit committees to total audit committee directors), firm size (log of assets), inventory (proportion of inventory to assets), receivables (proportion of debtors to assets), non-audit fees

(log of non-audit fees), firm complexity (log of subsidiaries), firm profitability (return on assets), London-based auditor (1 if the firm's auditor is based in London otherwise 0) (Ghafran & O'Sullivan, 2017). Other female directors on audit committees (proportion of female members on audit committees who are neither public accounting experts nor CFO experts).

7.4 Results and discussion

7.4.1 Descriptive statistics

Table 7.2 presents descriptive statistics. Female directors on audit committees with public accounting expertise constitute 2.4 percent in our sample while those with CFO expertise constitute 1.1 percent. Also, the proportion of female directors on audit committees with neither of the above mentioned expertise comprises of 19 percent. Further, independent directors' mean value is around 0.6. This suggests the compliance of the UK firms to the Corporate Governance Code requiring firms to structure their board in such a way that at least half of it is independent (Li et al., 2008).

Table 7.3 reports correlation matrix, showing that female public accounting experts and female CFO experts on audit committees are positively and significantly correlated with audit fees. However, any conclusions can only be made after controlling for other variables affecting audit fees (Zalata et al., 2018). Despite the correlations amongst independent variables in this table, our study does not suffer from multicollinearity concerns because the VIFs are all below 10 (highest VIF value for the model below is 2.82) (Bose et al., 2017; Jackling & Johl, 2009).

Table 7.1 Variable definition

Variables	Definition
Dependent variable:	
logaf	Natural log of audit fees
Independent variables:	
pfempub	Proportion of female directors on audit committees who are public accounting experts
pfemcfo	Proportion of female directors on audit committees who have CFO experience
ppfempub	Predicted value of the proportion of female public accounting experts on audit committees (main independent variable in the second stage of 2sls)
Control variables:	
pfemrem	Proportion of female directors on audit committees who are neither public accounting experts nor have CFO experience
acsize	Total directors present on the audit committee
acmeet	Total audit committee meetings held in a year
acpind	Ratio of independent directors on the audit committee to total audit committee directors
pind	Ratio of independent directors to number of directors
lognaf	Natural log of non-audit fees
logta	Natural log of total assets
pstock	Ratio of stock to assets
pdebtor	Ratio of receivables to assets
london	Dummy variable (determined as 1 if the auditor is located in London otherwise 0)
logsub	Natural log of the number of subsidiaries
roa	Ratio of net income to assets
lev	Ratio of liabilities to assets
salegr	Yearly growth in sales
mtb	Ratio of the firm's market value of equity to the firm's book value of equity
returngr	Yearly growth in the market price
IND	Industry effects
YE	Year effects
Instruments for two-stage least squares regression:	
lpfempub	Lagged (one-year) proportion of female directors with public accounting expertise on audit committees
prate	Ratio of female participate rate to male participation rate in the region in which the firm is headquartered

Table 7.2 Descriptive statistics

Variables	Mean	Standard deviation	Minimum	Maximum
logaf	7.140	1.317	1.099	10.589
pfempub	0.024	0.077	0.000	0.333
pfemcfo	0.011	0.051	0.000	0.400
pfemrem	0.184	0.173	0.000	0.750
acpid	0.990	0.064	0.000	1.000
acsize	3.961	1.065	2.000	8.000
acmeet	4.533	1.684	1.000	15.000
pind	0.564	0.109	0.000	0.857
lognaf	6.311	1.372	1.099	9.864
logta	15.071	1.461	12.140	19.621
pstock	0.124	0.175	0.000	0.928
pdebt	0.105	0.087	0.000	0.660
london	0.762	0.426	0.000	1.000
logsub	2.837	1.027	0.000	6.031
roa	0.082	0.105	-1.343	0.391

All variables are defined in Table 7.1.

Table 7.3 Correlation analysis

	Logaf	*pfempub*	*pfemcfo*	*pfemrem*	*acpid*	*acsize*	*acmeet*	*pind*	*lognaf*	*logta*	*pstock*	*pdebt*	*london*	*logsub*	*roa*
logaf	1.000														
pfempub	0.077*	1.000													
pfemcfo	0.085*	-0.065*	1.000												
pfemrem	0.053	-0.098*	-0.026	1.000											
acpid	0.180*	-0.016	0.032	0.071*	1.000										
acsize	0.260*	-0.016	0.109*	0.263*	0.029	1.000									
acmeet	0.409*	0.033	0.054	0.036	0.104*	0.053	1.000								
pind	0.548*	0.060*	0.142*	0.114*	0.392*	0.334*	0.416*	1.000							
lognaf	0.737*	0.003	0.032	-0.016	0.130*	0.199*	0.404*	0.430*	1.000						
logta	0.751*	0.078*	0.045	0.166*	0.110*	0.223*	0.476*	0.520*	0.637*	1.000					
pstock	-0.326*	-0.016	0.090*	0.087*	0.043	-0.062*	-0.153*	-0.163*	-0.295*	-0.186*	1.000				
pdebt	0.117*	-0.037	0.041	-0.135*	0.043	0.052	-0.082*	-0.102*	-0.017	-0.266*	-0.126*	1.000			
london	0.345*	0.034	0.117*	-0.080*	0.102*	0.173*	0.199*	0.331*	0.326*	0.329*	0.006	-0.194*	1.000		
logsub	0.453*	0.039	0.014	-0.085*	0.159*	0.107*	0.139*	0.223*	0.297*	0.213*	-0.282*	0.164*	0.096*	1.000	
roa	-0.082*	0.037	0.010	0.023	0.000	0.068*	-0.131*	-0.005	-0.081*	-0.124*	0.055	0.156*	-0.162*	0.129*	1.000

All variables are defined in Table 7.1. * represents the significance level at 0.1.

7.4.2 Regression analysis

As the firms in our sample are present for more than one year, time-series dependence (given firm's residuals correlated over periods) (Peterson, 2009) may cause standard errors to be biased (Ghafran & O'Sullivan, 2017). In order to address this problem, this study clusters standard errors at the firm level (Ghafran & O'Sullivan, 2017; Hassanein & Hussainey, 2015). Further, as part of managing cross-sectional dependence (given year's residuals correlated across firms) (Peterson, 2009), we introduce year dummies as per Hassanein and Hussainey (2015).

Table 7.4 reports the multiple regression analysis and shows that public accounting expertise of female directors on audit committees is significantly and positively associated with audit fees. It also reports that CFO expertise of female directors on audit committees has a significant and positive association with audit fees, which contradicts with Abernathy et al. (2014), who fail to find a significant association between CFO expertise of audit committee and financial reporting timeliness. Further, Table 7.5 shows the results after utilising another measure for determining female public accounting experts on audit committee (dummy measure, which is 1 if the audit committee consists of at least one female director with public accounting expertise, otherwise 0) and it reports that our finding is robust to another definition of female public accounting experts on audit committees. However, we also have to assess whether the findings persist when the propensity to meet or beat the zero earnings benchmark is used.

As predicted and in line with Ghafran and O'Sullivan (2017), independent directors, the complexity of the audit, firm size and receivables are positively associated with audit fees. Moreover, London-based auditor and non-audit fees also have a significant and positive association with audit fees as per our expectations. This result also corroborates Ghafran and O'Sullivan (2017) and O'Sullivan (2000). Moreover, negative association between firm performance and audit fees is also in line with the expectations. Furthermore, we find a

significant and positive association between other female directors on audit committees who are neither public accounting experts nor CFO experts and audit fees as expected.

Table 7.4 Ordinary least-squares regression (Audit fees)

Variables	
pfempub	0.808**
	(2.583)
pfemcfo	0.853**
	(2.142)
pfemrem	0.402*
	(1.847)
acpid	0.095
	(0.215)
acsize	-0.018
	(-0.511)
acmeet	-0.014
	(-0.372)
pind	1.118***
	(2.785)
lognaf	0.289***
	(4.694)
logta	0.492***
	(11.740)
pstock	-0.465
	(-1.521)
pdebt	2.922***
	(3.774)
london	0.207**
	(2.000)
logsub	0.213***
	(5.071)
roa	-0.621**
	(-1.987)
Constant	-3.831***
	(-5.789)
Observations	765
Adjusted R-squared	0.819
Year effects	YES
Industry effects	YES
F Test	77.53***

This table presents the results for the association between female directors with public accounting and CFO expertise on audit committees and audit fees. Standard errors are clustered (firm level) while *t*-statistics are reported in parenthesis. All variables are defined in Table 7.1. *** p<0.01, ** p<0.05, * p<0.1

Table 7.5 Robustness (Alternative measure)

dpfempub	0.222**
	(2.604)
pfemcfo	0.862**
	(2.162)
pfemrem	0.406*
	(1.864)
acpid	0.0963
	(0.216)
acsize	-0.0209
	(-0.590)
acmeet	-0.0141
	(-0.376)
pind	1.114***
	(2.771)
lognaf	0.288***
	(4.692)
logta	0.492***
	(11.76)
pstock	-0.466
	(-1.522)
pdebt	2.935***
	(3.781)
london	0.212**
	(2.045)
logsub	0.212***
	(5.055)
roa	-0.621**
	(-1.987)
Constant	-3.818***
	(-5.746)
Observations	765
Adjusted R^2	0.819
Year effects	YES
Industry effects	YES
F Test	79.97***

This table presents the results for the association between female directors with public accounting on audit committees and audit fees using an alternative measure to ascertain female public accounting experts on audit committees. Standard errors are clustered (firm level) while *t*-statistics are reported in parenthesis. All variables are defined in Table 7.1. *** p<0.01, ** p<0.05, * p<0.1

7.4.3 Meet or beat the zero earnings benchmark

Our study also utilises meeting or beating the zero earnings benchmark as another audit quality proxy to assess the robustness of our findings in the audit fee model. Graham et al. (2005) posit that firms may manage earnings to meet or beat the zero earnings benchmark to avoid any perception of poor prospects and, consequently, reduction in their market price. Thus, in order to avoid any negative consequences on their market value, firms may manage earnings to meet or beat the zero earnings benchmark (Srinidhi et al., 2011; Tanyi & Smith, 2015). In agreement with this discussion, Srinidhi et al. (2011) contend that earnings marginally above zero are more likely to portray manipulated earnings than actual firm performance. Given that this management of earnings to meet or beat the zero earnings benchmark (DeFond & Zhang, 2014; Srinidhi et al., 2011) is likely to be mitigated by way of higher audit quality (Becker et al., 1998; Chen et al., 2011; Francis et al., 1999), DeFond and Zhang (2014) contend that meeting or beating the zero earnings benchmark captures audit quality. Thus, following Aobdia (2019), Francis and Yu (2009) and Tanyi and Smith (2015), we determine meeting or beating the zero earnings benchmark as 1 if the return on assets is between 0 and 0.05, otherwise 0. Thus, in this audit quality proxy, a negative sign in our main variables suggests higher audit quality.

In this model, the same corporate governance control variables as in the audit fee model (audit committee size, audit committee meetings, independent directors, and audit committee independence) are adopted. However, the direction predicted in the audit fee model is opposite to the sign expected in this case. For example, if audit committee meetings were expected to be positively associated with audit fees then in the propensity to meet or beat the zero earnings benchmark model, they are predicted to be negatively associated. As mentioned above, this reflects that the higher value of meeting or beating the zero earnings benchmark is indicative of lesser earnings manipulation and thereby higher audit quality. We adopt the firm's financial condition, size, and growth as the control variables in this audit quality proxy, following Arun

et al. (2015). Firms with greater leverage and/or poor performance may perform more earnings manipulation, as it reflects the poor financial condition of the firm (Ittonen et al., 2013; Zalata et al., 2018). Poor transparency in firms with high growth (Ittonen et al., 2013) is also likely to cause earnings management (Arun et al., 2015; Chih, et al., 2008). Higher scrutiny of large firms may also lead these firms to manipulate earnings (Chih et al., 2008). Hence, firm size, leverage, and firm growth are expected to be positively associated with meeting or beating the zero earnings benchmark while a negative association is predicted in the case of firm performance.

These controls variables are determined as follows. Firm size (log of assets), leverage (ratio of liabilities to assets), firm growth (yearly growth in sales and market-to-book ratio) (Arun et al., 2015) and firm performance (yearly market return) (Srinidhi et al., 2011). Sample for this proxy is same as in the audit fee model. Meeting or beating the zero earnings benchmark data was obtained from the FAME database while the corporate governance data was hand collected from the annual reports. Moreover, annual market price return and firm's market value were obtained from Datastream while FAME was utilised for obtaining data pertaining to the rest of the financial characteristics.

Column 1 of Table 7.6 reports that female members on audit committees with public accounting expertise are significantly and negatively associated with the propensity to meet or beat the zero earnings benchmark. We also find that CFO expertise of female directors on audit committees is insignificantly associated with the propensity to meet or beat the zero earnings benchmark. Hence, only our finding of public accounting expertise in the audit fee model is robust to the audit quality proxy of meeting or beating the zero earnings benchmark. Overall, we conclude that female accounting experts with public accounting expertise, rather than those with CFO experience, are associated with higher audit quality. As a result, our findings support hypothesis 5 while they do not support hypothesis 6. Moreover, this finding corroborates the

evidence in Abernathy et al. (2014) who find that, unlike audit committee directors with CFO experience, audit committee members with public accounting expertise improve timeliness of financial reporting. In terms of control variables, we find that other female directors on audit committees, audit committee independence, audit committee meetings, firm size, firm performance, and leverage are significant and in line with the expectations.

As part of the robustness test and notwithstanding that this causes a fall (from 245 to 192) in the firm-year observations that have met or are marginally above the zero earnings benchmark, this study follows Aobdia (2019) and Francis and Yu (2009) in employing another cut-off of 0 to 0.04 and find consistent results in Column 2 of Table 7.6.

Table 7.6 Meeting or beating the zero earnings benchmark

Variables	Column 1	Column 2
pfempub	-1.402*	-1.548**
	(-1.922)	(-2.476)
pfemcfo	-0.506	-1.544
	(-0.394)	(-1.249)
pfemrem	-1.030***	-1.342***
	(-2.723)	(-3.326)
acpid	-3.069***	-3.433***
	(-2.767)	(-3.136)
acsize	-0.086	-0.109*
	(-1.428)	(-1.828)
acmeet	-0.097**	-0.137***
	(-2.354)	(-3.448)
pind	-0.114	0.288
	(-0.169)	(0.436)
logta	0.205***	0.220***
	(3.896)	(3.794)
returngr	-0.267*	-0.262
	(-1.774)	(-1.445)
lev	0.643**	0.574*
	(2.018)	(1.809)
salegr	0.036	-0.226
	(0.143)	(-0.838)
mtbr	-0.002	-0.001
	(-1.110)	(-0.902)
Constant	0.069	0.246
	(0.054)	(0.192)
Observations	1,123	1,123
Year effects	YES	YES
Industry effects	YES	YES
Pseudo R^2	0.136	0.148
Wald test	100.96***	110.76***

This table reports the association between female public accounting and CFO experts in audit committees and the propensity to meet or beat the zero earnings benchmark. Column 1 presents the results with the cut-off of 0-0.05 while Column 2 reports the results with the cut-off of 0-0.04. Standard errors are clustered (firm level) while *z*-statistics are reported in parenthesis. All variables are defined in Table 7.1. *** p<0.01, ** p<0.05, * p<0.1

7.4.4 Endogeneity

Characteristics related to the public accounting expertise of female directors on audit committees may also be related to audit quality. Hence, it is pertinent to address the endogeneity bias in our finding. This study utilises two methods to address endogeneity.

Propensity score matching is the first method employed to deal with endogeneity arising from observable firm characteristics. In this method, all the control variables in our study are used to ascertain the firm's likelihood (propensity score) to include female public accounting experts on audit committees (Chen et al., 2017; Habib et al., 2017; Hardies et al., 2015; Hooghiemstra et al., 2019; Peel, 2018; Shipman et al., 2017), as, according to Hardies et al. (2015), this follows propensity score matching research. Then, following nearest neighbour matching, we match a treated (presence of female public accounting experts on the audit committee) firm with a control (absence of female directors on audit committees with public accounting expertise) firm on the basis of nearest propensity score, creating matched pairs (Lai et al., 2017; Peel, 2018). As per Shipman et al. (2017), each control firm is matched once since they argue that it is the common approach adopted in accounting research. In order to match the pairs closely and thereby maintain the matching quality, a calliper distance (maximum difference permitted in the treated and control firms' propensity score) of 0.01 is chosen (Gull et al., 2018; Hooghiemstra et al., 2019). Then, regression is performed on the sample consisting of the matched pairs, which Peel (2018) argues involves a more robust approach because "if either the matching or the parametric model is correct, but not necessarily both, causal estimates will still be consistent" (p. 175).

Table 7.7 shows that the treated and control firms are similar as all *t*-tests for the observable firm characteristics are insignificant and thus the firms in our matched sample do not differ over all the observable firm characteristics except female directors on audit committees with public accounting expertise (primary variable), depicting success in our matching process (Habib et al., 2017; Peel, 2018). As a result, any influence on audit fees will be due to female public accounting experts on audit committees rather than due to the observable firm characteristics (Habib et al., 2017; Peel, 2018). Table 7.8 shows a significant and positive association between female public accounting experts on audit committee and audit fees in our

matched sample, showing the robustness of our finding to endogeneity addressed through propensity score matching.

Table 7.7 Treated and control mean difference test

Variable	Treated	Control	*p*-value
pfemrem	0.141	0.133	0.784
acpid	0.986	0.993	0.547
acsize	4.083	4.067	0.935
acmeet	4.783	5.050	0.473
pind	0.599	0.588	0.572
lognaf	6.479	6.439	0.892
logta	15.456	15.486	0.930
pstock	0.109	0.114	0.826
pdebt	0.101	0.104	0.821
london	0.800	0.817	0.818
logsub	3.058	2.866	0.226
roa	0.099	0.115	0.233

All variables are defined in Table 7.1.

Table 7.8 Propensity score matched regression (Endogeneity test)

pfempub	0.948*
	(1.783)
pfemrem	0.645
	(1.313)
acpid	-0.622
	(-0.706)
acsize	-0.044
	(-0.592)
acmeet	-0.088
	(-1.433)
pind	0.075
	(0.065)
lognaf	0.578***
	(2.915)
logta	0.395***
	(4.450)
pstock	0.360
	(0.426)
pdebt	3.977***
	(4.578)
london	-0.298
	(-1.641)
logsub	0.173**
	(2.008)
roa	-1.825**
	(-2.166)
Constant	-1.211
	(-0.793)
Observations	120
Adjusted R^2	0.842
Year effects	YES
Industry effects	YES
F test	172.28***

This table reports the endogeneity test based on the propensity score matched sample. Standard errors are clustered (firm level) while *t*-statistics are reported in parenthesis. All variables are defined in Table 7.1. *** p<0.01, ** p<0.05, * p<0.1

Second, we use two-stage least squares regression, where two instruments are utilised. Each instrument should be associated with *pfempub* (female directors with public accounting expertise on audit committee (endogenous variable) but it should not be associated with audit fees (dependent variable) and thereby audit quality. Firstly, one-year lag of *pfempub* (*lpfempub*) is adopted, which is in line with Renders et al. (2010), who posit that corporate governance policies show a lower tendency to vary. Hence, *lpfempub* is expected to have a positive association with *pfempub*. Also, the Hausman test points to the validity of using the lag as an instrument, as it reveals that *pfempub* is not endogenous (not associated with error term), which suggests that the lag will also be unlikely to be associated with the error term due to the persistence of the audit committee mechanisms over time (Bruynseels & Cardinaels, 2014; Caramanis & Lennox, 2008). Secondly, we utilise the female-to-male participation rate (*prate*), given that a firm may have greater availability of female directors if the firm's headquarter is located in a region with higher *prate* and thus *prate* is expected to be positively associated with *pfempub* (Chen, Leung, & Goergen, 2017; Zalata et al., 2018). Further, it is unlikely to be associated with audit fees as there is no empirical evidence suggesting such a link (Chen et al., 2017). The participation rates were collected from the Office of National Statistics and the information about the firms' headquarters were obtained from the Osiris database. Column 1 of Table 7.9 reports a positive and significant association between *prate* and *pfempub* as expected. In line with our prediction, it also shows a significant and positive association between *lpfempub* and *pfempub*. Also, the instruments are considered relevant (associated with *pfempub*) and valid (unrelated to audit fees), based on the tests shown in Table 7.9. Cragg-Donald statistic of 520.519 is higher than 19.93 which is the minimum threshold in the case of two instruments (Chen et al., 2017; Hooghiemstra et al., 2019). Moreover, as per the significance of Kleibergen-Paap test, the instruments do not suffer from under-identification

(Hooghiemstra et al., 2019). Further, the insignificance of the Hansen *J*-test indicates the validity of the instruments (Ciftci et al., 2019; Wintoki et al., 2012).

After regressing *pfempub* on the instruments and the control variables to generate predicted values of *pfempub*, we replace *pfempub* with *ppfempub* (predicted values of *pfempub*) in our second-stage regression shown in Column 2 of Table 7.9. It shows that *ppfempub* has a positive and significant association with audit fees, suggesting our finding is robust to endogeneity bias, according to Chen et al. (2017).

Table 7.9 Instrumental regression (Endogeneity test)

	Column 1	Column 2
ppfempub		1.015***
		(2.745)
lpfempub	0.872***	
	(17.970)	
prate	0.240*	
	(1.801)	
pfemrem	-0.019	0.480**
	(-1.332)	(2.061)
acpid	-0.017	0.314
	(-0.562)	(0.762)
acsize	0.001	-0.006
	(0.404)	(-0.227)
acmeet	0.001	-0.020
	(0.939)	(-0.470)
pind	0.015	1.093***
	(0.500)	(2.667)
lognaf	-0.002	0.259***
	(-1.306)	(4.320)
logta	0.000	0.507***
	(0.053)	(12.050)
pstock	0.010	-0.566*
	(0.966)	(-1.900)
pdebt	-0.002	2.819***
	(-0.114)	(3.493)
london	0.002	0.257**
	(0.478)	(2.514)
logsub	0.002	0.198***
	(1.204)	(4.804)
roa	0.018	-0.600*
	(1.064)	(-1.852)
Constant	-0.173	-4.064***
	(-1.575)	(-6.111)
Observations	654	654
Adjusted R^2	0.646	0.834
Year effects	YES	YES
Industry effects	YES	YES
F test	169.76***	84.63***
Cragg-Donald F-statistic	520.519	
Kleibergen-Paap test	*p*-value: 0.000	
Hansen *J* test	*p*-value: 0.348	

This table reports the endogeneity tests. Column 1 presents the first-stage results for the two-stage instrumental variable regression (2sls). Second-stage results for 2sls are presented in Column 2. Standard errors are clustered (firm level) while *t*-statistics are reported in parenthesis. All variables are defined in Table 7.1. *** p<0.01, ** p<0.05, * p<0.1

7.5 Additional analysis (Corporate governance quality and audit committee meetings)

Effectiveness of accounting expertise on audit committees may depend on the way a firm is structured (DeFond et al., 2005; Krishnan & Visvanathan, 2008, 2009). Hence, we also concentrate on two factors (board independence and audit committee meetings) and assess whether the finding related to female public accounting experts on audit committees is contingent on these variables.

Audit committee performance may rely on attitudes of the board and thus audit committee is likely to be ineffective if the board is functioning poorly (DeFond et al., 2005). Therefore, effective monitoring of accounting experts may rely on whether the firm's corporate governance quality is high (Krishnan & Visvanathan, 2008, 2009). DeFond et al. (2005) find that audit committees with accounting experts induce positive market reaction only in the case of firms with better governance. Similarly, Krishnan and Visvanathan (2008) find that accounting experts on audit committees increase accounting conservatism only if the firms are strongly governed.

Berghe and Levrau (2004) argue that in the context involving conflicts of interests (such as our case where there is separation of ownership and control) independent directors play a key role and thus suggest that board independence form an integral part of corporate governance. Empirically, too, independent directors on the board support audit committees in meeting their objective of financial reporting review. Beasley and Salterio (2001) find that the greater board independence is positively associated with inclusion of audit committee members with financial reporting knowledge. Thus, following Byard and Weintrop (2006) and Gupta, Misra, and Shi (2017), we ascertain a firm's corporate governance quality through board independence.

Further, DeFond et al. (2005) contend that greater audit committee meetings may drive the better monitoring of accounting experts on audit committee, given that audit committee meetings demonstrate the intensity of the monitoring level. Menon and Williams (1994) also hold a similar viewpoint, as they argue that audit committee can only act as an effective monitoring tool if it holds more audit committee meetings.

This suggests that our positive result in relation to female public accounting experts may only arise if firms have either greater board independence or lower audit committee meetings. Following Gupta et al. (2017), we create two sub-samples based on the sample median of the independent directors on board and then re-run the regression on each sample. We also adopt a similar methodology for audit committee meetings. Further, in line with Krishnan and Visvanathan (2008, 2009), the variable on which the sample is partitioned is excluded from the regression.

Column 1 and Column 2 of Table 7.10 suggests that female public accounting experts on audit committees are positively and significantly associated with audit fees but only if the firms have greater presence of independent directors on their boards. Column 1 and Column 2 of Table 7.11 also corroborate our finding, as we find a negative and significant association between female public accountings experts on audit committees and meeting or beating the zero earnings benchmark. Overall, the results suggest that female public accounting experts on audit committees have a positive link with audit quality but only if the board is strong in terms of greater presence of independent directors.

Table 7.10 Sub-samples segregated on the median of board independence (Audit fees)

	Column 1	Column 2
pfempub	0.934**	0.555
	(2.249)	(1.280)
pfemrem	0.368	0.498*
	(1.637)	(1.669)
acpid		0.560
		(1.309)
acsize	-0.00732	-0.0317
	(-0.165)	(-0.775)
acmeet	-0.0453	0.0563*
	(-1.036)	(1.777)
pind		
lognaf	0.400***	0.162***
	(3.760)	(3.074)
logta	0.479***	0.542***
	(7.220)	(7.743)
pstock	-0.257	-0.636**
	(-0.598)	(-2.042)
pdebt	4.361***	2.139***
	(6.673)	(2.787)
london	0.203	0.200*
	(1.210)	(1.667)
logsub	0.214***	0.252***
	(4.467)	(4.056)
roa	-0.928**	-0.365
	(-2.237)	(-1.123)
Constant	-3.450***	-4.069***
	(-4.046)	(-3.895)
Observations	392	373
Adjusted R^2	0.810	0.768
Year effects	YES	YES
Industry effects	YES	YES
F Test	66.96***	28.27***

This table reports the association between female public accounting experts on audit committees and audit fees based on sub-samples related to board independence. Column 1 and Column 2 represents regression analysis based on above the sample median of board independence and below the sample median of board independence respectively. Further, audit committee independence variable in Column 1 could not be included because in that sample all firm-year observations have a fully independent audit committee. Standard errors are clustered (firm level) while *t*-statistics are reported in parenthesis. All variables are defined in Table 7.1. *** p<0.01, ** p<0.05, * p<0.1

Table 7.11 Sub-samples segregated on the median of audit committee meetings (Audit fees)

	Column 1	Column 2
pfempub	0.992	0.831*
	(1.338)	(1.776)
pfemrem	0.600**	0.148
	(2.625)	(0.485)
acpid	1.584***	-0.0987
	(2.887)	(-0.221)
acsize	-0.00257	-0.0206
	(-0.0681)	(-0.442)
acmeet		
pind	-0.0357	1.509***
	(-0.0774)	(2.973)
lognaf	0.328***	0.242***
	(2.771)	(3.341)
logta	0.533***	0.502***
	(5.089)	(9.973)
pstock	-0.696	-0.360
	(-1.523)	(-1.065)
pdebt	6.046***	2.169***
	(9.728)	(2.897)
london	0.576***	0.125
	(2.798)	(1.075)
logsub	0.209***	0.238***
	(5.072)	(4.184)
roa	-1.233***	0.111
	(-5.378)	(0.223)
Constant	-6.278***	-3.775***
	(-3.823)	(-5.452)
Observations	284	481
Adjusted R^2	0.848	0.792
Year effects	YES	YES
Industry effects	YES	YES
F Test	184.63***	61.25***

This table reports the association between female public accounting experts on audit committees and audit fees based on sub-samples related to audit committee meetings. Column 1 and Column 2 represents regression analysis based on above the sample median of audit committee meetings and below the sample median of audit committee meetings respectively. Standard errors are clustered (firm level) while *t*-statistics are reported in parenthesis. All variables are defined in Table 7.1. *** p<0.01, ** p<0.05, * p<0.1

Column 1 and Column 2 of Table 7.12 report that a positive and significant association between female public accounting experts on audit committees and audit fees is confined to firms with lower audit committee meetings. Similarly, Column 1 and Column 2 of Table 7.13 show that only firms with lower audit committee meetings experience a negative and significant association between female public accounting experts on audit committees and the propensity to meet or beat the zero earnings benchmark. Hence, we conclude that the positive association between audit committees with female public accounting experts and audit quality is restricted to firms with lower audit committee meetings. However, unlike the board independence sub-samples, our sub-samples in the case of audit committee meetings are unequal to a large extent, indicating caution when drawing conclusion from the inferences pertaining to sub-samples of audit committee meetings.

Table 7.12 Sub-samples segregated on the median of board independence (Meeting or beating the zero earnings benchmark)

	Column 1	Column 2
pfempub	-1.834*	-1.038
	(-1.857)	(-0.935)
pfemrem	-1.149**	-0.654
	(-2.516)	(-1.205)
acpid		-4.011***
		(-3.352)
acsize	-0.136*	-0.106
	(-1.857)	(-1.210)
acmeet	-0.159***	0.0284
	(-3.598)	(0.364)
pind		
logta	0.110**	0.399***
	(2.109)	(3.900)
returngr	-0.172	-0.372
	(-0.931)	(-1.520)
lev	0.940**	0.319
	(2.074)	(0.781)
salegr	-0.254	0.159
	(-0.625)	(0.474)
mtbr	-0.00574*	-0.00264
	(-1.656)	(-1.266)
Constant	-0.887	-2.224
	(-0.994)	(-1.333)
Observations	567	555
Pseudo R^2	0.138	0.223
Year effects	YES	YES
Industry effects	YES	YES
Wald test	80.38***	97.69***

This table reports the association between female public accounting experts on audit committees and meeting or beating the zero earnings benchmark based on sub-samples pertaining to board independence. Column 1 and Column 2 represents probit regression analysis based on above the sample median of board independence and below the sample median of board independence respectively. Further, audit committee independence variable in Column 1 could not be included because in that sample all firm-year observations have a fully independent AC. Standard errors are clustered (firm level) while *z*-statistics are reported in parentheses. All variables are defined in Table 7.1. *** $p<0.01$, ** $p<0.05$, *$p<0.1$

Table 7.13 Sub-samples segregated on the median of audit committee meetings (Meeting or beating the zero earnings benchmark)

	Column 1	Column 2
pfempub	-0.977	-1.616*
	(-0.979)	(-1.718)
pfemrem	-0.694	-1.456***
	(-1.315)	(-2.818)
acpid	-2.650	-3.915***
	(-1.090)	(-3.463)
acsize	-0.117	-0.0859
	(-1.467)	(-1.150)
acmeet		
pind	-1.283	0.484
	(-1.279)	(0.658)
logta	0.190***	0.306***
	(2.776)	(3.752)
returngr	-0.243	-0.414*
	(-1.010)	(-1.814)
lev	0.187	0.894**
	(0.412)	(2.239)
salegr	0.780	-0.307
	(1.510)	(-1.133)
mtbr	-0.0101*	-0.000406
	(-1.685)	(-0.243)
Constant	-0.279	-1.050
	(-0.106)	(-0.737)
Observations	412	711
Pseudo R^2	0.183	0.181
Year effects	YES	YES
Industry effects	YES	YES
Wald test	87.99***	112.73***

This table reports the association between female public accounting experts on audit committees and meeting or beating the zero earnings benchmark based on sub-samples pertaining to audit committee meetings. Column 1 and Column 2 represents probit regression analysis based on above the sample median of audit committee meetings and below the sample median of audit committee meetings respectively. Standard errors are clustered (firm level) while *z*-statistics are reported in parentheses. All variables are defined in Table 1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

7.6 Supplementary analysis

Non-audit fees increase the economic relationship between the firm and the auditor (Firth, 1997; Lim & Tan, 2008; Srinidhi & Gul, 2007). Thus, in order to protect their incomes accrued through the provision of non-audit services, auditors may accede to management pressure (Ferguson, Seow, & Young, 2004; Habib, 2012), negatively affecting the audit quality (Lim & Tan, 2008). Markelevich and Rosner (2013) find that non-audit fees are positively linked with firms being sanctioned for fraudulent financial reports. In addition, Frankel, Johnson, and Nelson (2002), Ferguson et al. (2004), Habib (2012) and Lin and Hwang (2010) evidence that firms with greater non-audit fees are associated with high earnings management. Further, Firth (2002) and Habib (2012) substantiate that non-audit fees are positively associated with the likelihood to issue unqualified audit opinion.

Legislators also consider non-audit fees as a factor that undermines auditor independence (Basioudis, Papakonstantinou, & Geiger, 2008; Firth, 2002; Habib, 2002; Lim & Tan, 2008; Lisic, 2014; Markelevich & Rosner, 2013). SOX in the US banned auditors from providing most types of non-audit services (Krishnan, Su, & Zhang, 2011), while the European Parliament imposed restrictions on the magnitude of non-audit fees (Bell et al., 2015). As mentioned above, such negative perceptions of non-audit services originate from non-audit fees' capacity to create significant economic relationships between auditors and firms (Amir, Guan, & Livne, 2010; Tepalagul & Lin, 2015), which cause auditors to be vulnerable to management pressure (Gul, Jaggi, & Krishnan, 2007).

On the other hand, the greater knowledge from the provision of non-audit services is likely to enhance the auditor's capability to improve audit quality (Koh, Rajgopal, & Srinivasan, 2013; Lennox, 1999; Lim & Tan, 2008; Markelevich & Rosner, 2013), which stems from auditors' greater likelihood in identifying problematic issues (Wu et al., 2016). Furthermore, in the case of dispute with management on financial reporting issues, an auditor is less likely to be

threatened with dismissal if the client relies on the non-audit services provided by the auditor (Wu et al., 2016). Cadbury Committee (1992, para. 5.11), too, is against imposing limits on non-audit services, as it states that the prohibition "would limit the freedom of companies to choose their sources of advice". Antle, Gordon, Narayanamoorthy, and Zhou (2006), Koh et al. (2013) and Svanström (2013) find that non-audit fees improve financial reporting quality. Further, Ianniello (2012) shows a positive association between non-audit fees and modified audit opinion.

Empirical evidence related to the association with non-audit fees and audit quality is also mixed (Ettredge, Fuerherm, Guo, & Li, 2017; Svanström, 2013) and, therefore, inconclusive. Studies indicate that non-audit fees either reduce audit quality (Ferguson et al., 2004; Firth, 2002; Frankel, et al., 2002; Habib, 2012; Lin & Hwang, 2010), improve audit quality (Antle et al., 2006; Ianniello, 2012; Koh et al., 2013; Svanström, 2013) or do not affect audit quality (Ashbaugh, LaFond, & Mayhew, 2003; Chung & Kallapur, 2003; DeFond, Raghunandan, & Subramanyam, 2002).

Audit committees are responsible for approving non-audit fees and monitor whether assigning non-audit services to the auditors is negatively affecting the auditor's judgement (Wu et al., 2016). Therefore, audit committees approve non-audit fees only if the advantages of better financial reporting quality from non-audit fees outweigh the negative effects arising from the greater economic bond (Gramling, Jenkins, & Taylor, 2010; Lisic, 2014) and thus an effective audit committee may consider both arguments in assessing the impact of non-audit services (Lisic, 2014). This indicates that better audit committee mechanisms are more likely to take into account the opposing arguments related to non-audit fees when assessing their impact on audit quality. The aforementioned analysis suggests greater monitoring quality of female public accounting experts on audit committees, which allows us to examine whether they are also associated with non-audit fees.

Our dependent variable is the log of non-audit fees (Campa & Donnelly, 2016; Ferguson et al., 2004; Gul et al., 2007). Level of non-audit fees is a better measure than proportion of non-audit fees because auditor's economic dependency on the client is more accurately captured by level of non-audit fees, for example, if the non-audit fees and total auditor fees are $10000 and $30000 respectively for firm A and are $10 million and $40 million respectively for firm B then it is reasonable to say that the auditor is likely to be more economically reliant on firm B, given the significant nature of the non-audit fee figure, which is also the conclusion if the level of non-audit fees is utilised, however, the ratio (non-audit fees/total fees paid to external auditor) will conclude that the auditor is reliant more on firm A (Chung & Kallapur, 2003; Lee & Mande, 2005).

Several control variables are utilised in this study. Audit committee size is likely to have an impact on non-audit fees, given that having more members on the audit committee translates into greater access to resources (Zaman et al., 2011). Further, audit committee meetings could be a useful mechanism to assess and evaluate non-audit fees' impact on audit quality, as more meetings may mean audit committees will be "more likely to discover potential problems through increase in resources which would enable them to help improve the quality of its oversight" (Zaman et al., 2011, p. 171). Further, audit committee independence is likely to ensure a more objective monitoring of the auditor (Wu et al., 2016) and thereby is expected to affect non-audit fees. Due to the opposing arguments related to the effect of non-audit fees, the direction of the associations between audit committee size, audit committee independence and audit committee meetings with non-audit fees is not predicted. A positive association is, however, expected between independent directors and non-audit fees. This is because independent directors on the firm's board are required to support the management in developing strategies (Higgs, 2003) thus they may suggest more consulting services to improve firm performance. Zaman et al. (2011) find a positive association between independent

directors and non-audit fees. Audit committee size is ascertained by the number of directors present on the audit committee; number of audit committee meetings held in a year ascertains audit committee meetings; audit committee independence is determined through proportion of independent directors on audit committees and the proportion of independent directors controls the representation of independent directors on the board (Ghafran & O'Sullivan, 2017).

Large firms perform a broad range of activities and hence are more likely to need consulting services (Abbott, Parker, Peters, & Raghunandan, 2003), so firm size is controlled through the log of total assets (Saeed & Sameer, 2017). Further, firms with more subsidiaries are complex (Zaman et al., 2011) and, therefore, likely to require more non-audit services (Abbott et al., 2003). The log of subsidiaries is used to control for the impact of subsidiaries (Ghafran & O'Sullivan, 2017). Also, growing firms demand more consultation (Frankel et al., 2002), as these firms may require counsel on the ways to sustain their growth levels. Annual growth in sales determines firm growth. In addition, firms with high leverage require rigorous supervision to safeguard themselves from high business risk (Zaman et al., 2011). Leverage is ascertained through the proportion of total liabilities to total assets (Arun et al., 2015). Moreover, poorly performing firms may also require more advise to improve their performance (Abbott et al., 2003; Zaman et al., 2011); hence, return on assets is utilised to control for performance (Ghafran & O'Sullivan, 2017). Return on assets is determined through the proportion of net income to total assets. Firm size, number of subsidiaries, leverage and firm growth are expected to increase non-audit fees, while firm performance is likely to reduce non-audit fees. Further, following Zaman et al. (2011), this study includes standardised residuals from the audit fee model to capture the additional effect of audit fees on non-audit fees by using the same independent variables as in the non-audit fee model. They contend that most variables that affect audit fees also affect non-audit fees, which creates the need to control for the incremental

effect of audit fees on non-audit fees. Lastly, industry and year effects are also included in the model (Zaman et al., 2011).

Table 7.14 presents the ordinary least-squares regression results and indicates that the proportion of female public accounting experts on audit committees have a significant and negative association with non-audit fees. Regarding the control variables, audit committee size, audit committee meetings and independent directors are positively related with non-audit fees. In addition, number of subsidiaries, firm size, and leverage significantly and positively relate with non-audit fees, which is in line with our expectations. Lastly, and similar to Zaman et al. (2011), the incremental effect of audit fees on non-audit fees is significant. The VIFs in all models in Table 7.14 are considerably below the limit of 10, as the maximum value is 2.09, suggesting multicollinearity to be not a major concern (Bose et al., 2017; Mangena & Pike, 2005).

As an additional test, non-audit fee is deemed as 1 (high non-audit fees) if a firm's non-audit fee is higher than the median value of non-audit fee, otherwise 0 (low non-audit fee), hence, logistic regression (due to the dichotomous nature of this method to ascertain non-audit fees) is also performed. Table 7.15 presents regression results for logistic regression and it shows that the significant and negative association between female public accounting experts on audit committee and non-audit fees persists, showing robustness of the finding to another measure of non-audit fees.

Table 7.14 Regression (Non-audit fees)

pfempub	-0.790*
	(-1.789)
pfemrem	-0.760***
	(-2.721)
acmeet	0.104***
	(4.583)
acsize	0.104**
	(2.261)
acpid	0.325
	(0.501)
pind	1.015*
	(1.879)
salegr	-0.0916
	(-0.817)
logsub	0.167**
	(2.518)
lev	0.692**
	(2.430)
roa	-0.168
	(-0.376)
logta	0.466***
	(11.17)
res	0.467***
	(10.84)
Constant	-3.457***
	(-3.689)
Observations	825
Adjusted R^2	0.609
Year effects	YES
Industry effects	YES
F Test	32.30***

This table presents the association between female public accounting experts on audit committees and non-audit fees. All standard errors are clustered at the firm level. Reported results include *t*-statistics in parentheses along with coefficients. Apart from res (standardised residuals from audit fee model using the same variables as in the non-audit fee model), all variables are defined in Table 7.1. *** p <0.01, ** p <0.05, * p <0.1

Table 7.15 Logistic regression (Non-audit fees)

pfempub	-3.308*
	(-1.693)
pfemrem	-2.133**
	(-2.536)
acmeet	0.216**
	(2.489)
acsize	0.276*
	(1.891)
acpid	4.845
	(1.297)
pind	2.079
	(1.209)
salegr	-0.279
	(-0.674)
logsub	0.292
	(1.530)
lev	1.294
	(1.538)
roa	0.0146
	(0.0132)
logta	1.142***
	(7.406)
res	1.015***
	(5.984)
Constant	-25.58***
	(-5.386)
Observations	825
Pseudo R^2	0.403
Wald test	499.75***
Year effects	YES
Industry effects	YES

This table presents the association between female public accounting experts on audit committees and non-audit fees using an alternative measure to ascertain non-audit fees (in this measure non-audit fees are divided into high and low non-audit fees based on the median of non-audit fees and thus a dummy variable is created in which 1 is the firm-year observation with high non-audit fees while 0 represents those with low non-audit fees). All standard errors are clustered at the firm level. Reported results include *z*-statistics in parentheses along with coefficients. Apart from res (standardised residuals from audit fee model using the same variables as in the non-audit fee model), all variables are defined in Table 7.1. *** p <0.01, ** p <0.05, * p <0.1

7.7 Conclusion

Recent evidence (Bennouri et al., 2018; Gull et al., 2018) suggests that female directors' effectiveness stems from their individual attributes as opposed to the regulators' view that each female director can be regarded as an effective monitor. This indicates the importance of examining and thereby identifying the characteristics that drive the monitoring effectiveness of female directors. Given the CFO's diminishing role related to financial reporting (Abernathy et al., 2014; Aier et al., 2005) and empirical evidence (Abernathy et al., 2014) showing that public accounting expertise of audit committees, rather than CFO expertise, is positively associated with financial reporting timeliness, we test whether female accounting experts on audit committees with public accounting expertise and those with CFO expertise are associated with audit quality. We study the context of audit quality, given that it indicates the extent of reliability on financial reports.

As per Aobdia (2019), audit fees, financial restatements, and meeting or beating the zero earnings benchmark capture the audit quality assessments of the practitioners. This is important as the practitioners hold detailed information about the audit performed (Aobdia, 2019; Bell et al., 2015). Hence, as Lai et al. (2017) regard financial restatements to be outside the control of audit committees, we consider audit fees and meeting or beating the zero earnings benchmark to be the proxies that can appropriately ascertain audit quality. Consequently, we utilise the propensity to meet or beat the zero earnings benchmark as an additional audit quality proxy. We find that female directors on audit committees with public accounting expertise are positively associated with audit quality while we substantiate an insignificant association between CFO expertise of female audit committee directors and audit quality. Moreover, our result related to public accounting expertise of female audit committee members is robust to endogeneity concerns. Furthermore, this study's findings are in line with Abernathy et al. (2014). Utilising a distinct context than this study, they substantiate that accounting experts on

audit committees with public accounting expertise are positively associated with financial reporting timeliness, while the members with CFO expertise are insignificantly linked with financial reporting timeliness.

Our study suggests that firms can increase their audit quality if they include female directors with public accounting expertise on their audit committees. Further, this study's findings contradict with the view of the regulators that female directors act as better monitors even if their individual characteristics are ignored, as we find that there may be some characteristics (in our case CFO expertise of female directors) that are ineffective in improving the monitoring of financial reports. Moreover, the results suggest that regulators should focus on public accounting expertise when making efforts to increase accounting experts on audit committees.

This study's limitations are as follows. Even though we have utilised multiple methods to address the endogeneity issue, we cannot claim that our findings are entirely free from the endogeneity bias. Further, we rely on the annual reports of firms to segregate public accounting and CFO expertise; thus, our results are based on the assumption that firms have accurately presented the biographical information of the directors.

Chapter 8: Conclusion

8.1 Background of the study

Audit committees are responsible for monitoring of the financial reports and thus play a vital role in ensuring the integrity of financial reports. Thus, there is need for in-depth research into the audit committee mechanisms contributing towards the effectiveness of audit committees in terms of audit quality. Audit quality is an important factor to consider when examining audit committee mechanisms, as Bédard and Gendron (2010) contend that audit quality ascertains whether a particular audit committee mechanism is effective.

Regulators are increasingly focusing on greater representation of female directors (Lai et al., 2017; Pucheta-Martínez et al., 2016). Various countries have implemented legislations mandating female directors in the form of quotas, while countries where such regulations do not exist have put constant pressures on companies to enhance the extent of female directors present (Comi, Grasseni, Origo, & Pagani, 2019; Main & Gregory-Smith, 2018). This suggests that regulators consider female directors to be effective in enhancing audit quality. Furthermore, literature suggests that females are risk-averse (Byrnes et al., 1999; Man & Wong, 2013; Powell & Ansic, 1997), conform to higher ethical behaviour (Pucheta-Martínez et al., 2018; Ruegger & King, 1992; Smith & Oakley, 1997) and make high quality decisions (Gul et al., 2011; Gul et al., 2013; Srinidhi et al., 2011), which, in addition to regulatory attention, also indicates that thorough research on the contribution of female directors on audit committees towards enhancing audit quality is required. However, some firms are still reluctant to hire female directors and are not convinced of the benefits accruing from female directors, which can be demonstrated by slow progress towards to a greater percentage of female directors and by shareholders stating that they are not interested in gender diversity (Main & Gregory-Smith, 2018; Rawlinson, 2018; Schutte, 2018). This study contends that this may be due to the unconvincing evidence related to female directors on audit committees and audit quality. This

stems from the researchers' use of weak audit quality proxies to discern audit quality, as they do not effectively take into account the audit quality evaluations performed by practitioners.

Practitioners (audit regulators and audit firms) possess more insights into the audit performed, as Aobdia (2019) argues that these practitioners possess more information pertaining to the audit and thus are in a better position to assess audit quality. Aobdia (2019) identifies the audit quality proxies utilised by academics and then empirically tests the audit proxies with audit quality assessments of the practitioners (PCAOB assessments and audit firms' internal inspections). He contends that those audit quality proxies that are associated with practitioners' assessment are likely to be stronger proxies to capture the construct of audit quality and finds that restatements, audit fees and the propensity to meet or beat the zero earnings benchmark are the only three audit quality measures that are associated with the audit quality assessments of both practitioners. He argues that it is important that a proxy should be associated with both practitioners' assessment, as it helps attenuate weaknesses involved in PCAOB's assessments. As Lai et al. (2017) argue that financial misstatements are not under the direct influence of audit committees, this thesis argues that adopting both audit fees and the meeting or beating the zero earnings benchmark as audit quality proxies is the most suitable approach to ascertain the effectiveness of audit committee mechanisms. Therefore, similar to DeFond and Zhang (2014), Aobdia (2019) suggests researchers to adopt multiple measures of audit quality in order to mitigate the issues originating from type 1 errors.

Considering the above argument, the literature review suggests that the link between female directors on audit committees and audit quality is unconvincing, as there is no study that utilises both audit fees and meeting or beating the zero earnings as audit quality proxies to examine female presence on audit committees. Prior literature also fails to utilise the propensity to meet or beat the zero earnings benchmark to evaluate female directors on audit committees. According to Aobdia (2019), this is likely to encompass type 1 error which, in the context of

the association between female directors on audit committees and audit quality, suggests that by excluding the use of meeting or beating the zero earnings benchmark there is an uncertainty as to whether female directors on audit committees are conclusively associated with audit quality. It is only after a study utilises both audit fees and the propensity of meet or beat the zero earnings benchmark in the same study that we can conclusively conclude that female directors on audit committees can act as effective monitors and enhance audit quality, because in the context of audit committees, these two measures are the only two measures that can effectively capture the practitioners' assessment of audit quality.

Further, current evidence (Bennouri et al., 2018; Bravo & Alcaide-Ruiz, 2019; Elmaghri et al., 2019; Gull et al., 2018) points that the female directors do indeed act as effective monitors but their effectiveness depends on whether they possess certain qualities. Therefore, it will be an inaccurate assumption that all female directors on audit committees are of similar ability to enhance monitoring. As a result, this study also examines whether the various types of financial expertise possessed by female directors on audit committees increase audit quality, as the only study (Bravo & Alcaide-Ruiz, 2019) examining the types of female financial experts on audit committee assesses their effectiveness in terms of voluntary forward-looking disclosures. Hence, no study utilises the context of audit quality that helps assure the integrity of financial reports. In addition, Bravo and Alcaide-Ruiz (2019) fail to further segregate non-accounting expertise of female audit committee members.

Further, adopting the context of financial expertise is motivated on two accounts. First, the financial expertise of audit committees is a critical aspect in the context of audit committees, as it has attracted considerable attention from regulators and researchers. Academics are, however, uncertain on what constitutes a financial expert, given the conflicting evidence involving accounting versus non-accounting financial expertise (García-Sánchez et al., 2017; Ghafran & O'Sullivan, 2017; Goh, 2009; Krishnan & Visvanathan, 2008). Second, previous

literature on the effectiveness of female financial experts on audit committees is mixed. Although Zalata et al. (2018) find that female financial experts increase the quality of financial reporting, Ittonen et al. (2010) find no significant association between female financial experts and audit fees. This thesis contends that this conflicting evidence may have been because of the varying composition of the distinct types of financial expertise in the sample of these studies. Hence, it needs to be empirically examined whether the mixed evidence arose because one study had a greater proportion of a particular type of financial expertise.

Furthermore, diversion of the CFO's role from accountancy to also including strategy and investor relation issues is expected to suggest poor accountancy skills (Abernathy et al., 2014; Aier et al., 2005). However, CFOs are also responsible for financial reports (Billings et al., 2014; Jiang et al., 2010), which is likely to indicate better financial reporting skills. Evidence with regard to whether female accounting experts with CFO experience perform similar monitoring functions as compared to those female audit committee directors with public accounting expertise is absent. Research on this aspect is particularly important in the context of recent literature confirming that female directors affect managerial oversight; however, this only occurs with female directors possessing particular characteristics.

8.2 Summary of the study's findings

Empirical analysis in chapter five attempts to conclusively investigate the effectiveness of female directors on audit committees in terms of audit quality by utilising both audit fees and the propensity to meet or beat the zero earnings benchmark as audit quality proxies. It reveals a positive association between female directors on audit committees and audit quality. Chapter six examines the link between the types of female financial experts on audit committees and audit quality and finds that the accounting expertise of female financial experts is significantly and positively associated with audit quality while there is an insignificant association between non-accounting (supervisory and finance) female financial experts and audit quality. Chapter

seven analyses the relationship between female audit committee members with CFO experience and public accounting expertise in terms of audit quality. This chapter substantiates that female audit committee directors whose accounting expertise is derived from CFO experience are not associated with audit quality, while those with public accounting expertise are positively and significantly associated with audit quality.

8.3 Practical contributions of the study

First, this thesis contributes to the audit quality literature, as it finds that female directors on audit committees, especially those with public accounting expertise, enhance audit quality. Second, it furthers the literature related to the financial reporting oversight of female financial experts. Prior literature is mixed in this regard. Ittonen et al. (2010) find no association between female financial experts on audit committees and financial reporting monitoring, while Zalata et al. (2018) substantiate a positive association. This study suggests that the conflicting evidence may have been driven by the researchers' failure to divide the financial expertise into accounting and non-accounting expertise, as it finds that female accounting experts on audit committees are positively associated with audit quality and female non-accounting experts on audit committees are insignificantly related with audit quality.

Third, this study finds that accounting expertise, especially public accounting expertise, of female audit committee directors positively affect financial reporting monitoring. Thus, it contributes to the recent literature evidencing that female directors' effectiveness depends on their attributes. Fourth, this study offers insights into the evidence in Zalata et al. (2018) that female financial experts on audit committees improve financial reporting monitoring, as this thesis finds that female non-accounting or CFO experts may not be effective in enhancing financial reporting oversight.

Fifth, as per the mixed empirical evidence, it is unclear whether accounting or non-accounting expertise (financial expertise types) on audit committees is effective in terms of higher monitoring of financial reports. Given the argument in the current literature that female directors' enhanced monitoring is dependent on their characteristics, this study contributes to the debate concerning the definition of financial expertise by finding that female accounting experts, rather than female non-accounting experts, on audit committees enhance audit quality.

8.4 Theoretical contributions of the study

Firstly, this study contributes to the agency theory, as this study provides a convincing evidence that female directors on audit committees safeguard the interests of shareholders. Secondly, as this thesis evidences that female directors on audit committees with non-accounting or CFO expertise are insignificantly linked with audit quality, the application of agency theory to female directors on audit committees may be dependent on the type of financial expertise held by them. Lastly, this study applies the theoretical framework of Hillman and Dalziel (2003) to the context of female directors on audit committees. The findings of this study support their theoretical framework, where agency theory and resource dependence theory are amalgamated.

8.5 Implications of the study

This study has multiple implications for policy-makers and firms. First, although the results support the considerable efforts of regulators pertaining to the greater representation of female directors, the findings suggest that regulators should also focus on the specific qualities/attributes of female directors. Additionally, the evidence does not support the legislators' efforts of implementing female quotas without taking into consideration the qualities or the skills possessed by them. Second, if the firms aim to increase their audit quality then they should include female directors on audit committees; however, the firms should also concentrate on the profile of these directors and include accounting experts, specifically those with public accounting expertise, on audit committees. Thirdly, this study's evidence supports

the regulatory efforts of attempting to regard only accounting expertise as the only category to be acceptable for defining financial expertise on audit committees. Fourthly, regulators' efforts to increase accounting expertise on audit committees should be focused on the accounting expertise derived from public accounting experience than from CFO experience.

8.6 Limitations of the study and avenues for future research

The limitations and suggestions for future research of this study are as follows. This thesis relies on the annual reports of companies to collect data on the type of financial expertise possessed by female directors on audit committees. Thus, the accuracy of segregating various female financial experts on audit committees and placing them into multiple categories depends on the information provided by the firms. Further, although this research utilises multiple techniques to mitigate the problems arising from endogeneity, it has to be mentioned that the endogeneity concerns cannot be completely ruled out. Moreover, this study only utilises quantitative research in analysing the research questions, thus, future research can offer deeper analysis by conducting qualitative research through interviews with female audit committee members.

Appendices

Appendix A

Carrilion

The collapse of Carrilion, one of the largest construction companies in the UK, led to its auditor, KPMG, facing strong criticism for failing to ensure that the financial reports represented the real situation, as they did not challenge management with respect to questionable assumptions under which Carrilion recorded revenue figure (Blackburn, 2019; Banham, 2018).

Ted Baker

In 2018, KPMG, who was the auditor of Ted Baker (a luxury clothing range), was fined by the FRC for admitting misconduct related to the financial statements of the company (Blackburn, 2019).

Appendix B

The following sub-sections define the practitioners, namely PCAOB inspections and the internal reviews of audit firms respectively. In each sub-section, it is explained why the practitioner's assessment is likely to capture audit quality. Further, the circumstances where the PCAOB inspections may not be linked with audit quality and how the internal reviews of the auditors are likely to overcome those weaknesses are also discussed in the relevant sub-sections.

PCAOB

After several highly publicised corporate governance failures, PCAOB was established in 2002 by the Sarbanes-Oxley Act to monitor auditing firms (Gunny & Zhang, 2013; Church & Shefchik, 2012; Glover, Prawitt, & Taylor, 2009) and thus "protect the interests of investors and further the public interest in the preparation of informative, accurate, and independent audit reports" (Carcello, Hollingsworth, & Mastrolia, 2011, p. 85; Daugherty & Tervo, 2010, p. 203).

A PCAOB inspection is likely to capture audit quality due to the following reasons. Firstly, it has four divisions consisting of registration, inspections, standard-setting and enforcement; however, the resources are mostly devoted to the inspections division (Carcello et al., 2011; Gunny & Zhang, 2013), which could lead to PCAOB's inspections being linked to audit quality (Gunny & Zhang, 2013), as these inspections involve monitoring of auditor's work depending on issuer's circumstances (Aobdia, 2019). Secondly, PCAOB inspectors are likely to be independent, as they are prohibited from being currently practicing auditors (Church & Shefchik, 2012). In addition, this may not have a negative impact on the technical competency of the auditors, given that PCAOB calls for the inspectors to have, on average, 12 years of experience of public practice (Lennox & Pittman, 2010; Aobdia, 2019). Survey evidence in Daugherty and Tervo (2010) notes that audit firms consider PCAOB inspectors to have

appropriate technical know-how and demonstrate sufficient focus. This suggests a greater effort of the inspectors to identify audit issues. Thirdly, given that auditors are provided with multiple opportunities to provide further information about the audit to the inspectors, there is less likelihood of PCAOB inspectors identifying inaccurate audit deficiencies (Aobdia, 2019). Fourthly, it is difficult to predict for the audit firms the timing of inspection and thus auditors will be unlikely to be able to strategically improve audit quality in advance of the inspection, resulting in a clear link between the inspections and audit quality (Aobdia, 2019).

Following are the examples presented in Aobdia (2019, p. 172) that relate to audit deficiencies identified by PCAOB inspections:

> The issuer engaged a specialist to calculate the estimated amount of a significant contingent liability. The amount calculated by the specialist exceeded the amount recorded by the issuer by an amount that was approximately 13 times the Firm's planning materiality. The Firm failed to perform sufficient procedures to test the contingent liability, as follows:
>
> • The Firm failed to assess the reasons for the differences between the issuer's and the specialist's assumptions.
>
> • The Firm's testing did not address the completeness of new claims filed, which is a key input used by the issuer in estimating the amount of this contingent liability, as it neither tested the completeness of the new claims data nor obtained evidence about the operating effectiveness of controls over the completeness of those data.
>
> In this audit, the Firm failed in the following respects to obtain sufficient competent evidential matter to support its audit opinion – …
>
> Certain of the issuer's contracts involve multiple phases. For purposes of revenue recognition, the issuer allocates revenue to various phases. In certain cases, this practice results in different profit margins for each phase. The Firm failed to test the reasonableness of the issuer's assertion that the revenue that was allocated to each phase was representative of the fair value of the delivered elements of that phase

The first example relates to the audit weaknesses in the audit performed by PwC in the US while the second example concerns the audit deficiencies of Deloitte's client in the US. However, the following concerns related to PCAOB inspections suggest that they may not capture audit quality. First, the technical competency of the inspectors may become obsolete

quickly (Carcello et al., 2011), given that PCAOB inspectors are full-time employees, therefore, it is likely that they may not possess current knowledge of complex accountancy issues due to a lack of time (Glover et al., 2009). Further, auditors, too, have pointed out that PCAOB inspectors have often failed to assess risky areas due to a limited understanding of complex issues (Glover et al., 2009). Second, although PCAOB is not a profit oriented organisation and is not financially reliant on audit firms, the SEC, a government body, appoints members on the board of PCAOB and thus it may be possible that the PCAOB could be influenced by the auditing profession (Aobdia, 2019). Third, as the PCAOB inspections focus on highly risky areas of the inspection (Houston & Stefaniak, 2013), they may not identify all audit weaknesses, which may introduce inaccuracies in the audit quality assessments of PCAOB (Gunny & Zhang, 2013).

Internal inspections of audit firms

Audit firms may conduct reviews of their own audits as part of their quality control procedures in order to assure that the audits were performed in accordance with the applicable audit standards and the audit firm's policies (Aobdia, 2019; Houston & Stefaniak, 2013). The independence and competency of these internal inspections is ensured by having distinct lines of authority, trained reviewers and incentives (Aobdia, 2019), which suggests the likelihood of these inspections capturing audit quality (Bell et al., 2015). This distinct mechanism, therefore, could mitigate the concerns from the PCOAB inspections mentioned above. Firstly, as mentioned earlier, the PCAOB may potentially be under the influence of the auditing profession (Aobdia, 2019), the internal inspections or reviews, however, are unlikely to suffer from this issue due to the structure of this mechanism defined above. Secondly, as opposed to PCAOB inspections, the internal inspections cover broader audit areas (Houstan & Stefaniak, 2013). Thirdly, they are conducted by experienced and talented employees of the audit firm (Bell et al., 2015), so they are likely to be more up to date with the technical aspects of

accountancy than the PCAOB inspectors, given that Glover et al. (2009) highlight the lack of current accountancy knowledge of PCAOB's full-time inspectors.

Appendix C

The following regulators' policies targeting the enhanced presence of female directors are adopted from Comi et al. (2019):

Spain

Spain implements a female quota policy that stipulates that there should be 40% of both genders represented on publicly listed companies. Although there are no sanctions on firms who do not abide by this policy, the law states that the firms who follow the aforementioned policy will be favourably considered at the time of awarding contracts related to public work.

France

France mandates the firms to include 40% of directors as females and states that directors will have their appointment annulled if they contravene this law.

Italy

Italy makes it compulsory for firms to have at least 33% of directors as females and the non-compliance bear sanctions such as financial penalty of 1 million euros and annulment of the whole board.

Appendix D

Thirty Percent Coalition

This step is endorsed by institutional investors such as the California Public Employees Retirement Plan and the State Teachers' Pension Plan and aims that public firms should include at least 30% female members on their boards by 2015 (Gull, 2018). This initiative also involved a campaign where letters were sent to companies with no female directors, which resulted in more than 150 companies hiring female directors (Lee, Marshall, Rallis, & Moscardi, 2015; Gull, 2018).

30% Club

Based on the view that "gender balance on boards not only encourages better leadership and governance, but diversity further contributes to better all-round board performance", this initiative was started in 2010 in the UK to ensure that FTSE 100 firms' female percentage on boards is 30%, and this has since been introduced in other countries (Lee et al., 2015, p. 28).

Davies Report

The Lord Davies report attracted attention amongst businesses and government because of its depiction of poor figures related to female representation on the UK firms' boards and, therefore, recommended investors of firms with poor gender diversity to consider female directors in the case of board appointments and also suggested corporate governance regulators to require firms to disclose and report the progress on their diversity policies (Department for Business, Innovation & Skills, 2011). In addition, it prompted Theresa May (the then Home Secretary and Minister for Women and Equality) to say that the UK government would consider the report's recommendations (Department for Business, Innovation & Skills, 2011).

This report urged FTSE 100 index firms to raise the female directors' percentage to 25% by 2015 (Gull, 2018). Furthermore, after this target was achieved Lord Davies urged all FTSE 350 index firms to include more female directors, so that female directors' representation reaches 33% by 2020 (Lee et al., 2015).

European Commission

The European Union is pushing for 40% representation of female directors in public firms and proposes that when considering a NED position, if the firm is constituted with male NEDs comprising of more than 60%, then they would be required to give priority to a female if she holds credentials that are equally comparable to those of male candidates (Boffey, 2017; Zillman, 2017).

2020 Women on Boards

2020 Women on Boards aims to raise the level of representation of female directors on the US boards to at least 20% by 2020 (Brooks, 2018; Gull, 2018).

Appendix E

Some of the statements made by CFOs are presented below:

CFOs have to position themselves as primary drivers of corporate strategy along with CEOs. They have to work as a strategist rather than a tactician to ensure the financial health and sustainability of their organizations and, most importantly, to ensure that shareholder expectations are met (International Federation of Accountants (IFAC), 2013, p.11).

The CFO is the key person in supporting management teams to make strategic decisions on how the organization will sustainably create value. Although providing financial and non-financial information and analysis is part of the role and plays to the traditional strength of professional accountants, a CFO is expected to contribute to strategic and management thinking as the partner to the business unit heads. At the end of the day, the organization and CFO are judged on the success or failure of the strategic choices made (IFAC, 2013, p. 13).

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