Further evidence on non-audit fees: Using the context of female directors on audit committees

Abstract

This study aims to examine the association between non-audit fees and audit quality by utilizing the context of gender-diverse audit committees. Further, we assess whether this link is moderated by industry-specialist auditors. This study utilized non-financial FTSE-350 firms over the period of seven years. In addition, we use ordinary least squares regression to test our research hypotheses. We find that female directors on audit committees are negatively related with non-audit fees, suggesting that non-audit fees reduce audit quality. Moreover, our results indicate that industry-specialist auditors positively moderate the link between gender-diverse audit committees and non-audit fees. This suggests that non-audit fees improve audit quality when the auditor is an industry-specialist. Our study does not support blanket restrictions on non-audit fees. It recommends regulators to consider industry expertise of auditors when devising non-audit fee restrictions. Moreover, our findings have implications for firms aiming to understand whether non-audit fees could be used for enhancing audit quality. By utilizing the context of female directors on audit committees, we conclusively assess the link between non-audit fees and audit quality. Further, this study provides a more robust evidence on whether industry-specialist auditors affect the relation between non-audit fees and audit quality.

Keywords: non-audit fees; audit quality; female directors; audit committees; industry-specialist auditors

1. Introduction

Legislators consider non-audit fees as a factor that undermines auditor independence (Basioudis *et al.*, 2008). SOX (the Sarbanes-Oxley Act) in the US (United States) banned auditors from providing most types of non-audit services (Krishnan *et al.*, 2011), while the European Parliament imposed restrictions on the magnitude of non-audit fees (Bell *et al.*, 2015). Such negative perceptions of non-audit services originate from non-audit fees' capacity to create economic relationships between auditors and firms (Amir *et al.*, 2010; Tepalagul and Lin, 2015), which cause auditors to be vulnerable to management pressure, thus negatively affecting the integrity of financial reports (Gul *et al.*, 2007). On the contrary, non-audit services improve auditors' knowledge about the firm, resulting in better audit quality (Koh *et al.*, 2013; Lennox, 1999; Lim and Tan, 2008).

Despite regulators' negative viewpoints on non-audit services and the potential of non-audit services to improve audit quality (Alves, 2013; Lim and Tan, 2008), the evidence related to non-audit fees' effect on audit quality is mixed (Ettridge *et al.*, 2017) and, therefore, inconclusive. Studies have indicated that non-audit fees reduce audit quality (Ferguson *et al.*, 2004; Frankel *et al.*, 2002; Habib, 2012; Hohenfels and Quick, 2020; Lin and Hwang, 2010; Firth, 2002), improve audit quality (Antle *et al.*, 2006; Koh *et al.*, 2013; Ianneillo, 2012; Svanstorm, 2013), or do not affect audit quality (Ashbaugh *et al.*, 2003; Castillo-Merino *et al.*, 2020; DeFond *et al.*, 2002; Garcia-Blandon *et al.*, 2020). Therefore, a more conclusive evidence is required to assess the effectiveness of non-audit fees.

Audit committee offer an appropriate corporate governance mechanism to answer the unresolved question of the effect of non-audit services on audit quality. 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,

2010). As a result, audit committees present a valuable research setting to understand the link between non-audit fees and audit quality.

Prior literature (Abbott *et al.*, 2003; Zaman *et al.*, 2011) examining the link between audit committee characteristics and non-audit fees has focused on audit committee independence, size, meetings, and financial expertise, which cannot be deemed sufficient to conclusively understand the link between non-audit fees and audit quality, as Aobdia (2019), DeFond and Zhang (2014) and Ghafran and O'Sullivan (2013) posit that the link between each of these audit committee characteristics and audit quality is mixed. Hence, this presents an argument for conducting a study in which the association between an audit committee characteristic, which is conclusively linked with better audit quality, and non-audit fees is investigated. Resultantly, examining female directors on audit committees and non-audit fees becomes critical, as it, given the strong empirical evidence (Abbasi *et al.* 2020; Lai *et al.* 2017) positively linking female directors on audit committees and audit quality, will provide valuable insights into the effect of non-audit fees on audit quality.

A number of regulators have devised policies that target improvements in female directors' representation in companies (Agyemang-Mintah and Schadewitz, 2019). Norway and Germany have implemented gender quotas (Lai *et al.*, 2017) while Australia, the US and the UK require firms to disclose their gender diversity policies (Ali *et al.*, 2014; FRC, 2018). The idea behind these policies stems from female directors' better communication skills and lower tolerance of opportunistic behaviour (Zalata *et al.*, 2018). Importantly, and relevant to this research, empirical evidence on the effectiveness of gender-diverse audit committees in terms of audit quality strongly suggests a positive association. Gender-diverse audit committees reduce discretionary accruals (Gull *et al.*, 2018; Srinidhi *et al.*, 2011; Thiruvadi and Huang, 2011; Zalata *et al.*, 2018), increase audit fees (Aldamen *et al.*, 2018; Ittonen *et al.*, 2010) and modify audit opinions (Pucheta-Martínez *et al.*, 2016). Indeed, Abbasi *et al.* (2020)

and Lai *et al.* (2017) provide a strong and conclusive evidence between female directors on audit committees and audit quality.

To investigate the link between gender-diverse audit committees and non-audit fees, the United Kingdom (UK) offers an appropriate setting. In the United States (US), Sarbanes-Oxley Act (SOX) banned auditors from providing most non-audit services (Krishnan *et al.*, 2011). However, in the UK, non-audit services are allowed if they are disclosed and safeguards are in place (Dart, 2011; Ratzinger-Sakel and Schönberger, 2015). Hence, the UK offers an environment where managers can potentially create substantial economic bonds with auditors through the greater use of non-audit services (Srinidhi and Gul, 2007). In addition, the UK does not impose gender quotas as compared to countries like France and Norway (FRC, 2018; Nekhili *et al.* 2020; Sultana *et al.* 2020); hence, allowing more variation among female directors on audit committees. Furthermore, the UK has a substantially lower litigation risk than the US (Khurana and Raman, 2004), as indicated by the greater frequency of class-action suits in the US (Seetharaman *et al.*, 2002). Thus, using the UK as the research setting allows the association between gender-diverse audit committees and non-audit fees to be attributed to female directors on audit committees, rather than to the high litigation risk causing female directors to act as better monitors (Habib, 2012).

As it has been conclusively determined that female directors on audit committees increase audit quality, it could be posited that if female directors on audit committees affect non-audit fees then this suggests that female directors on audit committees view non-audit fees to be a factor that affects (either positively or negatively) audit quality (thereby, offering a unique perspective on the mixed evidence related to non-audit fees and audit quality). Consequently, female directors on audit committees would analyse a particular factor and then ascertain whether, in their view, it increases or decreases audit quality. It is important to identify the perspective of female directors on audit committees because they have been conclusively

determined to have a positive impact on audit quality (thus offering a suitable research setting). No other study uses such a context (or for that matter, any context that has a conclusively positive impact on audit quality) to analyse the link between non-audit fees and audit quality. As our results suggest that female directors on audit committees negatively affect non-audit fees, this indicates that female directors on audit committees consider non-audit fees negatively in terms of audit quality.

The study contributes to the literature in multiple ways. First, empirical evidence strongly suggests a positive influence of gender-diverse audit committees on audit quality; therefore, the impact of gender-diverse audit committees on non-audit fees provides valuable insights into the mixed evidence related to the impact of non-audit fees on audit quality. In contrast to Nekhili *et al.* (2020) who examine the French context where joint audits are mandatory, we focus on the UK context which is devoid of joint audit regulation (Lesage *et al.* 2016). Given that joint audits have been associated with auditor independence and thereby non-audit fees (Quick and Schmidt, 2018; Ratzinger-Sakel *et al.* 2013), we argue that the association between gender-diverse audit committee and non-audit fees in Nekhili *et al.* (2020) may be affected by the joint audit setting in France.

Second, this study provides evidence that non-audit fees' effectiveness depends on the industry expertise of the auditor. Lim and Tan (2008) found that non-audit fees' effect on audit quality is dependent on the auditor's industry expertise. However, their result was dependent on the proxy used for audit quality, suggesting inconclusive evidence related to whether non-audit fees impact on audit quality is contingent on industry-specialist auditor. Hence, this study provides a more conclusive evidence on the contextual effectiveness of non-audit fees by utilizing gender-diverse audit committees which is strongly related to higher audit quality (given that the relation between female directors on audit committees and higher audit quality exists across various audit quality proxies).

This paper is structured as follows. Section two reviews the literature and develops the hypotheses. Section three details the methodology adopted to conduct this study. Section four provides the empirical results and explains the findings. The last section summarises the study and explains the implications of the findings.

2. Theoretical framework and hypotheses development

Non-audit fees increase the economic relationship between the firm and the auditor (Firth, 1997; Lim and Tan, 2008; Srinidhi and Gul, 2007). Thus, in order to protect their income accrued through the provision of non-audit services, auditors may accede to management pressure (Ferguson *et al*., 2004; Habib, 2012), negatively affecting the audit quality (Lim and Tan, 2008). Markelevich and Rosner (2013) found that non-audit fees are positively linked with firms being sanctioned for fraudulent financial reports. In addition, Frankel *et al*. (2002), Ferguson *et al*. (2004), Habib, (2012) and Lin and Hwang (2010) evidenced that firms with greater non-audit fees are associated with high earnings management. Further, Firth (2002) and Habib (2012) substantiated that non-audit fees are positively associated with the likelihood to issue unqualified audit opinion. On the other hand, greater knowledge from the provision of non-audit services is likely to enhance the auditor's capability to improve audit quality (Koh *et al*., 2013; Lim and Tan, 2008; Markelevich and Rosner, 2013). Antle *et al*. (2006), Koh *et al*. (2013) and Svanström (2013) found non-audit fees improve financial reporting quality. Further, Ianniello (2012) showed a positive association between non-audit fees and modified audit opinion. Resultantly, there is inconclusive evidence pertaining to non-audit fees and audit quality.

Given that audit committees are more likely to approve non-audit services if the benefit of improved financial reporting quality from greater auditor knowledge is higher than the loss of financial reporting quality from reduced auditor independence (Gramling *et al*., 2010; Lisic,

2014), 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 consider the opposing arguments related to non-audit fees when assessing their impact on audit quality.

Resource dependence theory suggests that directors act as pool of resources (which may include skills and experiences) from which a firm may benefit (Hillman and Dalziel, 2003; Hillman *et al.,* 2000). As a result, firms are likely to be affected by specific characteristics of directors. Female directors exhibit better communication skills (Ittonen *et al*., 2010; Zalata *et al*., 2018), which is likely to enhance the quality of decisions (Srinidhi *et al*., 2011; Zalata *et al*., 2018). Empirical research (Gull *et al*., 2018; Srinidhi *et al*., 2011; Thiruvadi and Huang, 2011; Zalata *et al*., 2018) has also evidenced that having a female presence on the audit committee reduces earnings management. Hence, the female directors' ability to raise issues and better decision-making quality (Zalata *et al*., 2018) enables them to evaluate the effect of non-audit fees on audit quality.

Moreover, female directors demonstrate greater ethical behavior than male directors due to the inherent variations in the personalities of men and women (Bouaziz *et al.* 2019; Pucheta-Martínez *et al.* 2018). Bernardi *et al.* (2009) found that female directors are positively associated with firms being deemed ethical. Thus, female directors show lower propensity to accept opportunistic policies (Srinidhi *et al*., 2011; Zalata *et al*., 2018). Moreover, female directors demonstrate lower overconfidence *(*Srinidhi *et al*., 2011; Thiruvadi, 2012). Empirically, Aldamen *et al*. (2018) found that female directors on audit committees improve audit fees. Similarly, Pucheta-Martínez *et al*. (2016) showed that having female directors on audit committee increases the likelihood of modified audit opinions. Further, Abbasi *et al.* (2020) and Lai *et al.* (2017) provide conclusive evidence in relation to female directors on audit committees and high audit quality. This enhanced monitoring effort of gender-diverse audit

committees (Lai *et al*., 2017; Pucheta *et al.*, 2018) causes female directors on audit committees to be in a better position to evaluate the impact of non-audit fees on audit quality.

Based on opposing arguments pertaining to the impact of non-audit fees on audit quality, this study does not predict a direction of the link between the presence of female directors on the audit committee and non-audit fees:

H_1: Female directors on the audit committee significantly affects non-audit fees.

Stakeholder theory suggests that female directors may implement policies that meet the expectations of stakeholders to attain their approval (Haque & Ntim, 2018). It suggests that stakeholders may expect female directors on audit committees to utilize non-audit services if they are provided by industry-specialist auditor to be able to benefit from their knowledge.

Auditors, who invest in developing industry-specific knowledge to attain greater reputation for auditing in specific industries, are likely to safeguard their reputational capital and avoid acceding to management demands (Krishnan, 2003; Lim and Tan, 2008). Further, industry-specialist auditors are more experienced in specific industries, which enhances their ability to detect errors (Balsam *et al.*, 2003; Owhoso *et al.*, 2002). In addition, industry-specialist auditors possess greater knowledge of the industry (Lim and Tan, 2008; Lin and Hwang, 2010). Evidence shows that industry-specialist auditors are less likely to contravene auditing standards (O'Keefe *et al.*, 1994), are negatively related to fraudulent financial reporting (Carcello and Nagy, 2004), and are associated with lower discretionary accruals (Balsam *et al*., 2003; Krishnan, 2003). This higher audit effectiveness of industry-specialist auditors (Krishnan, 2003) enhances their capability to take advantage of the knowledge spillover arising from the provision of non-audit services (Lim and Tan, 2008). Empirically, Lim and Tan (2008) showed that non-audit fees improve audit quality in the case of industry-specialist auditor. Therefore, female directors are likely to incorporate the higher monitoring

ability of industry-specialist auditors in evaluating the impact of non-audit fees, which led this study to predict a positive impact of the interaction of a gender-diverse audit committee and an industry-specialist auditor on non-audit fees:

H_2: There is a positive association between female directors on the audit committee and non-audit fees when the audit firm is industry-specialist.

3. Methodology

The study focused on non-financial FTSE 350 firms over the period 2009 to 2015. We start our sample from 2009 to avoid bias arising from global financial crisis of 2007/2008 (Ntim *et al*., 2013). As Lord Davies report suggests FTSE firms to enhance their female directors by 2015, we end our sample in 2015 given the limited variation after 2015 (Saidat *et al*., 2020). Financial firms were excluded because of their different regulatory and reporting environment (Ghafran and O'Sullivan, 2017). Given the data availability (Lueg *et al.*, 2014) and the coverage of both small and large firms (Lueg *et al.*, 2014; Zaman *et al.*, 2011), FTSE 350 firms were selected for this study. In addition, only firms that were part of the FTSE 350 from 2009 to 2015 were included because the corporate governance regime in the UK has a different director independence requirement for FTSE 350 and non-FTSE 350 firms (Ghafran and O'Sullivan, 2017). Resultantly, and after accounting for missing information, the number of firm-year observations in this study was 707 for the model presented below. Corporate governance data was collected manually from the annual reports. Financial data was collected from the FAME database; however, data related to sales growth and return on assets was obtained from Datastream, while supplementary data was collected from annual reports. The firms' websites were utilised to download the annual reports. Industry groups were identified from the Global Industry Classification Standard (GICS) in the Osiris database. The empirical model is presented below:

$$LOGNAF = \beta_0 + \beta_1 ACFP + \beta_2 ACFP*ISPEC + \beta_3 ISPEC + \beta_4 ACSIZE + \beta_5 FINEXP + \beta_6 IND + \beta_7 SALEGR + \beta_8 LOGSUB + \beta_9 LEV + \beta_{10} RES + \beta_{11} ROA + \beta_{12} LOGTA + IND + YE + \varepsilon$$

The log of non-audit fees determined the non-audit fees (LOGNAF) (Campa and Donnelly, 2016; Ferguson *et al.*, 2004; El Guindy and Trabelsi, 2021; 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).

Our first variable of interest (ACFP) was determined as the percentage of female directors on the audit committee (Ashfaq and Rui, 2019; Zalata *et al.*, 2018). While our second variable of interest was the interaction of the percentage of female directors on the audit committee and industry-specialist auditors (ACFP*ISPEC). Such variable will indicate whether female directors on audit committees increase non-audit fees if the auditor is industry-specialist. As per Basioudis and Francis (2007) and Reichelt and Wang (2010), an audit firm was considered to be an industry-specialist audit firm if it had the highest market share in terms of audit fees in an industry-year. The GICS classification in the Osiris database was utilised to identify the industry to which an audit firm belonged. Moreover, based on their findings, Audousset-Coulier *et al.* (2016) recommend that audit fees should be used to ascertain the market leader. In addition, it was theoretically appropriate to employ audit fees as a measure in this regard, given that this is in line with the literature pertaining to industrial organisations,

where industry output forms the basis for identifying market share (Audousset-Coulier *et al.*, 2016; DeFond *et al.*, 2000).

Several controls were utilised in this study. Audit committee size (ACSIZE) 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). Financial expertise on audit committees (FINEXP) may also impact non-audit fees due to the greater financial knowledge (Zaman *et al.*, 2011), which enables the committee members to evaluate non-audit fees effectively. Due to the opposing arguments related to the effectiveness of non-audit fees, the sign of the effect of both audit committee size and the financial expertise of the audit committee on non-audit fees is not predicted. A positive association is expected between independent directors (IND) and non-audit fees[1]. This is because independent directors are required to support the management in developing strategies (Higgs Report, 2003), so they may suggest using more consulting services to improve firm performance. Zaman *et al.* (2011) found a positive association between independent directors and non-audit fees. Audit committee size (ACSIZE) was ascertained by the number of directors present on the audit committee; the proportion of financial experts on the audit committee determined the financial expertise of the audit committee (FINEXP); and the proportion of independent directors controlled the representation of independent directors (IND) (Ghafran and O'Sullivan, 2017). Due to the limited guidance related to the definition of financial experts in UK corporate governance codes (Ghafran and O'Sullivan, 2017), the procedure to determine financial experts was based on Ghafran and O'Sullivan's (2017, p.584) work, where a director is deemed to be a financial

[1] Audit committee independence was not used as a control variable in this study because almost all of the firm-year observations consisted of fully independent audit committees (the mean value for the proportion of independent directors on the audit committees was 0.991).

expert if he/she is either an accounting expert (the individual holds or has held a position involving work related to accounting and auditing, which includes certified public accountants, chartered financial analysts, controllers, and auditors) or a non-accounting expert (the person holds or has held a position pertaining to financial analysis, investment banking, financial management, or the supervision of financial statement preparation, such as a chief executive officer (CEO) or company president).

Large firms perform a broad range of activities and hence are more in need of consulting, so firm size (LOGTA) was controlled and ascertained through the log of total assets (Abbott *et al.*, 2003). Firms with more subsidiaries are complex (Zaman *et al.*, 2011) and, therefore, require more non-audit services (Abbott *et al.*, 2003). The log of subsidiaries (LOGSUB) was used to control for the impact of subsidiaries (Ghafran and O'Sullivan, 2017). Growing firms, too, are in need of more consultation (Frankel *et al.*, 2002), as these firms require counsel on the ways to sustain their growth levels. Annual growth in sales determined firm growth (SALEGR). In addition, firms with high leverage require more consulting services to safeguard themselves from high financial risk (Zaman *et al.*, 2011). Leverage (LEV) was ascertained through the proportion of total liabilities to total assets (Arun *et al.*, 2015). Moreover, poorly performing firms also require more advice to improve their performance (Abbott *et al.*, 2003; Zaman *et al.*, 2011); hence, return on assets (ROA) was utilised to control for performance (Ghafran and O'Sullivan, 2017). Return on assets was determined through the proportion of net income to total assets. Firm size, number of subsidiaries, leverage, and firm growth were expected to increase non-audit fees, while firm performance was considered likely to reduce non-audit fees. As industry-specialist auditors have greater knowledge about the industry (Lim and Tan, 2008), firms are more likely to utilise industry-specialist auditors for non-audit services. This variable is defined above. Further, following Zaman *et al.* (2011), this study included standardised residuals from the audit fee model (RES) 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. All variables are defined in Table 1. Lastly, industry and year effects were also included in the model (Zaman *et al.*, 2011).

[Insert Table 1 here]

4. Results and discussion

4.1. Descriptive statistics and correlations

Table 2 presents the descriptive statistics. The mean value of the female proportion on the audit committee is 0.204, which is higher than the mean value of 0.12 found in the US (Zalata *et al.*, 2018). This could be attributed to Lord Davies' report, which increased female directors on UK boards (Department for Business, Innovation, and Skills and Cable, 2012). Further, the mean value of independent director is 0.560, which is similar to the mean value of 0.53 found by Zaman *et al.* (2011) in the UK.

[Insert Table 2 here]

Table 3 presents the correlation matrix. The proportion of female directors on the audit committee is negatively correlated with firm complexity and positively correlated with firm performance. However, all correlations among the independent variables are below 0.7, indicating no multicollinearity concerns (Zaman *et al.*, 2011)[2].

[Insert Table 3 here]

[2] As a further test, the VIFs (variance inflation factors) in all models in Table 4 are considerably below the limit of 10, as the maximum value is 3.35 (Bose *et al.*, 2017; Mangena and Pike, 2005).

4.2. Regression analysis

As the firms in this sample were present in multiple years, time-series dependence (a particular firm's residuals correlated over periods) (Petersen, 2009) caused standard errors to be biased (Ghafran and O'Sullivan, 2017). Following Ghafran and O'Sullivan (2017) and Hassanein and Hussainey (2015), this study tackled this issue by clustering the standard errors at the firm level[3]. In addition, this type of sample also causes cross-sectional dependence (a particular year's residuals correlated across firms) (Petersen, 2009), which was addressed by introducing year dummies, as per Hassanein and Hussainey (2015).

Column 1 of Table 4 presents the ordinary least-squares regression (OLS) results and indicates that female directors on audit committees have a significant and negative effect on non-audit fees. The result hence suggests that non-audit fees negatively affect audit quality. Hence, the finding supports hypothesis 1. Contrastingly, Column 2 of Table 4 indicates a significant and positive impact of the interaction of gender-diverse audit committee and the auditor's industry expertise on non-audit fees using OLS methodology. This shows that the impact of gender-diverse audit committees on non-audit fees is positive if the firm is audited by an industry-specialist auditor. Therefore, this result supports hypothesis 2. Overall, the findings indicate that non-audit fee reduce audit quality, but if it is provided by industry-specialist auditors, then it improves audit quality.

Regarding the control variables, audit committee size and independent directors affect non-audit fees positively, as per the study's expectations. In addition, number of subsidiaries, firm size, and leverage significantly and positively affect non-audit fees, which is also in line

with expectations. Lastly, and similar to Zaman *et al.*'s (2011) findings, the incremental effect of audit fees on non-audit fees is significant.

Non-audit fees are also determined by the proportion of non-audit fees to the total fees paid to the external auditor, as per Ferguson *et al.* (2004) and Frankel *et al.* (2002). As an additional test, non-audit fees are deemed 1 (high non-audit fees) if a firm's non-audit fees are higher than the median value of the non-audit fees, otherwise 0 (low non-audit fee); hence, logistic regression (due to the dichotomous nature of non-audit fees in this case) was also performed. Column 1 and Column 2 of Table 5 present the regression results for the proportion of non-audit fees to the total fees and the logistic regression, respectively. They indicate that the findings are robust to alternative definitions of non-audit fees.

[Insert Table 4 here]

[Insert Table 5 here]

4.3. Endogeneity

The study's main findings could be biased as a result of endogeneity, given that there could be other variables that affect both the presence of female directors on the audit committee and non-audit fees. In order to address the endogeneity concerns, two-stage least-square regression was utilised for the regression analysis in Table 4. Firstly, two instruments were utilised for the endogenous variable (proportion of female directors on the audit committee (Acfp)), namely a one-year lag of Acfp 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 and Cardinaels, 2014), a one-year lag of Acfp (Lacfp) is likely to be positively associated with Acfp. As Lacfp is predetermined, it is unlikely to affect non-audit fees in the current year (Caramanis and Lennox, 2008). In addition,

a higher female-to-male participation rate is also expected to positively affect Acfp (Chen *et al.*, 2017; Zalata *et al.*, 2018), as firms headquartered in the region where this rate is high are likely to have better female pools for selection (Chen *et al.*, 2017)[4]. Also, there is no reason to expect that Prate affects non-audit fees. Both Lacfp and prate are relevant instruments, as they are associated with the endogenous variable (Acfp). Column 1 of Table 6 (where using, ordinary least-squares regression, Acfp is regressed on the instruments and all other control variables (Bruynseels and Cardinaels, 2014)) indicates that both instruments are significant (Lacfp: p-value<0.01, prate: p-value<0.05) and positive, in line with our predictions. In addition, the F-value for the first-stage regression is significant (p<0.01) and is higher than the critical value of 10 in the case of fewer than three instruments, further suggesting the relevancy of the instruments (Wahid, 2018). These instruments are also valid and hence not associated with the dependent variable (Lognaf) because the Hansen-J test for the validity of instruments is insignificant (p-value: 0.405) (Ciftci *et al.*, 2019; Wintoki *et al.*, 2012).

Secondly, a predicted value for Acfp is generated using ordinary least squares regression in which Acfp is regressed on the instruments and all other control variables (Bruynseels and Cardinaels, 2014; Hooghiemstra, *et al*., 2019). Finally, in line with Caramanis and Lennox (2008), the predicted value for Acfp is used in the second-stage regression model (Column 2 of Table 6) (replacing Acfp used in previous models). The result still shows a negative association with non-audit fees, indicating that the result presented in the main analysis (Column 1 of Table 4) is robust to endogeneity concerns.

To address the endogeneity concerns in the interaction term and in line with Lisic (2014), the predicted value for Acfp is interacted with industry-specialist auditors (Isgc), which

[4] This rate was collected from the Office for National Statistics, and the data related to firms' headquarters was collected from OSIRIS.

replaces the original interaction term (Isacfp) in the second-stage regression model (Column 3 of Table 6). It shows that the interaction term is positively associated with non-audit fees. Therefore, the findings in Column 2 of Table 4 are also robust to endogeneity concerns.

[Insert Table 6 here]

5. Conclusion

Evidence related to the association between non-audit fees and audit quality is mixed, as some studies have indicated that non-audit fees reduce audit quality, while others have shown either no association or a positive association with audit quality. Given the strong link with gender-diverse audit committees and greater audit quality, this study argues that the context of female directors on audit committees offer an important setting to provide a more conclusive evidence on non-audit fees and audit quality.

The study's results suggest that female directors on audit committees consider non-audit fees to have a negative impact on audit quality and thus reduce non-audit fees. This indicates that non-audit fees' greater economic bonding results in reduced auditor independence and hence poor audit quality (Koh *et al.*, 2013). However, the findings suggest that the reputational incentives of industry-specialist auditors to withstand management pressure coupled with their better ability to capture advantages from knowledge spillover (Lim and Tan, 2008) cause female directors to increase non-audit fees in the case of industry-specialist auditors.

The study's findings have important implications. First, they do not support policies that restrict non-audit services, such as those of the SEC (Securities Exchange Commission) (Lim and Tan, 2008) and the European Parliament (Bell *et al.*, 2015), as non-audit fees improve audit quality if the services are provided by industry-specialist auditors. On the contrary, the results support policy-makers' negative views regarding non-audit services if non-industry-

specialist auditors provide these services; therefore, regulators should consider the auditor's expertise when devising non-audit service bans, rather than follow the current practice of enforcing a blanket ban or restrictions on non-audit fees. Second, if firms aim to improve audit quality, then they may acquire non-audit services from industry-specialist auditors.

This study also had a few limitations. First, this study utilizes the context of female directors on audit committees to ascertain the impact of non-audit fees on audit quality. As a result, we do not directly measure the link between non-audit fees and audit quality but rely on the context of female directors on audit committees to infer the association between non-audit fees and audit quality. Second, it focused on FTSE 350 firms, which are considered to be different from other listed firms by corporate governance regulators, as non-FTSE 350 firms follow less-stringent corporate governance policies (Ghafran and O'Sullivan, 2017). Hence, further work is required to assess whether the results apply to non-FTSE 350 firms. Moreover, future studies should examine the association between female directors on audit committees and non-audit fees in institutional settings different from the UK to analyse whether institutional factors affect our findings.

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Table 1 Variable definition

Variables	Definition
Non-audit fees (LOGNAF)	Natural log of non-audit fees
Female directors on audit committee (ACFP)	Proportion of female directors on audit committee
Interaction of female directors on audit committee (ACFP) and industry-specialist auditor (ISPEC-see below) (ACFP*ISPEC)	Proportion of female directors on audit committee multiplied by industry-specialist auditor dummy
Audit committee size (ACSIZE)	Number of audit committee members
Audit committee financial expertise (FINEXP)	Proportion of financial experts on audit committee (explained in the methodology section)
Board independence (IND)	Proportion of independent directors on board
Industry-specialist auditor (ISPEC)	1 if the firm's auditor is industry-specialist otherwise 0
Audit fee incremental effect (RES)	Standardized residuals of audit fee regression model
Firm size (LOGTA)	Natural log of total assets
Growth (SALEGR)	Annual growth in sales
Leverage (LEV)	Proportion of liabilities to assets
Complexity (LOGSUB)	Log of subsidiaries
Firm performance (ROA)	Return on assets (proportion of net income to total assets)
One-year lag of female directors on audit committee (LACFP)	One-year lag of proportion of female directors on audit committee
Female-to-male participation rate (PRATE)	Proportion of female participation rate to male participation rate
IND	Industry effects
YE	Year effects

Source: Authors' own creation

Table 2 Descriptive statistics

Variable	Mean	Std. Deviation	Minimum	Maximum
LOGNAF	6.304	1.330	1.099	10.870
ACFP	0.204	0.182	0.000	0.750
ACFP*ISPEC	0.085	0.161	0.000	0.750
ISPEC	0.380	0.486	0.000	1.000
ACSIZE	3.918	1.051	2.000	8.000
FINEXP	0.856	0.186	0.000	1.000
IND	0.560	0.107	0.000	0.857
RES	0.000	0.999	-10.479	3.119
SALEGR	0.065	0.225	-0.740	3.639
LOGTA	14.914	1.448	12.140	19.242
LEV	0.612	0.192	0.141	1.331
LOGSUB	2.859	0.994	0.000	5.832
ROA	8.859	9.083	-93.150	39.120

Source: Authors' own creation. All variables are defined in Table 1.

Table 3 Correlation matrix

	LOGNAF	ACFP	ACFP*ISPEC	ISPEC	ACSIZE	FINEXP	IND	RES	SALEGR	LOGTA	LEV	LOGSUB	ROA
LOGNAF	1.000												
ACFP	0.019	1.000											
ACFP*ISPEC	0.183***	0.538***	1.000										
ISPEC	0.222***	0.086**	0.676***	1.000									
ACSIZE	0.234***	0.259***	0.101***	0.031	1.000								
FINEXP	0.087**	0.119***	0.067*	-0.001	-0.008	1.000							
IND	0.416***	0.181***	0.128***	0.120***	0.363***	0.173***	1.000						
RES	0.317***	0.000	0.001	0.000	0.000	0.001	0.000	1.000					
SALEGR	-0.093**	-0.118***	-0.098***	-0.069*	-0.018	0.024	-0.056	0.004	1.000				
LOGTA	0.666***	0.149***	0.226***	0.200***	0.217***	0.180***	0.462***	0.000	-0.105***	1.000			
LEV	0.142***	0.133***	0.053	0.053	0.066*	-0.044	0.084**	-0.001	-0.155***	0.102***	1.000		
LOGSUB	0.287***	-0.007	0.085**	0.154***	0.113***	0.002	0.228***	-0.001	-0.056	0.192***	0.178***	1.000	
ROA	-0.070*	0.026	-0.014	-0.018	0.032	0.017	-0.011	-0.004	0.141***	-0.192***	-0.122***	0.176***	1.000

Source: Authors' own creation. All variables are defined in Table 1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4 Regression

	Column 1	Column 2
ACFP	-0.699**	-1.070***
	(-2.420)	(-2.893)
ACFP*ISPEC		0.848*
		(1.780)
ACSIZE	0.122***	0.127***
	(2.663)	(2.782)
FINEXP	-0.148	-0.147
	(-0.502)	(-0.510)
IND	1.268**	1.324***
	(2.525)	(2.633)
ISPEC	0.184**	0.005
	(1.981)	(0.038)
RES	0.423***	0.423***
	(9.545)	(9.399)
SALEGR	-0.169	-0.168
	(-1.329)	(-1.328)
LOGTA	0.509***	0.504***
	(10.200)	(9.983)
LEV	0.488**	0.526**
	(1.980)	(2.133)
LOGSUB	0.162***	0.162**
	(2.635)	(2.604)
ROA	0.002	0.002
	(0.610)	(0.609)
Constant	-3.298***	-3.238***
	(-4.199)	(-4.157)
Observations	707	707
Adjusted R^2	0.612	0.614
Year effects	YES	YES
Industry effects	YES	YES
F test	30.98***	31.43***

Source: Authors' own creation. All standard errors are clustered at firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in Table 1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5 Regression (Alternative proxy for non-audit fees)

	Column 1	Column 2
ACFP	-0.113**	-0.221***
	(-2.225)	(-3.274)
ACFP*ISPEC		0.246***
		(2.820)
ACSIZE	0.007	0.008
	(0.767)	(0.942)
FINEXP	-0.004	-0.004
	(-0.079)	(-0.077)
IND	-0.015	0.001
	(-0.161)	(0.011)
ISPEC	-0.010	-0.062**
	(-0.613)	(-2.518)
RES	-0.041***	-0.041***
	(-4.921)	(-4.800)
SALEGR	0.020	0.020
	(0.827)	(0.874)
LOGTA	-0.018**	-0.019**
	(-2.093)	(-2.195)
LEV	-0.006	0.005
	(-0.133)	(0.108)
LOGSUB	-0.022**	-0.022*
	(-2.001)	(-1.965)
ROA	0.000	0.000
	(0.648)	(0.651)
Constant	0.691***	0.708***
	(4.884)	(5.072)
Observations	707	707
Adjusted R^2	0.218	0.232
Year effects	YES	YES
Industry effects	YES	YES
F test	45.00***	45.61***

Source: Authors' own creation. All standard errors are clustered at firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in Table 1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6 Endogeneity (Two-stage least square regression)

	First-stage (Column 1)	Second-stage (Column 2)	Second-stage (Column 3)
ACFP		-1.304***	-1.799***
		(-2.959)	(-3.312)
ACFP*ISPEC			1.144*
			(1.805)
LACFP	0.720***		
	(24.860)		
PRATE	0.573**		
	(2.010)		
ISPEC	0.032***	0.209**	-0.049
	(3.395)	(2.284)	(-0.319)
ACSIZE	0.014***	0.152***	0.155***
	(2.925)	(3.200)	(3.246)
FINEXP	0.043	-0.028	-0.036
	(1.448)	(-0.092)	(-0.118)
IND	0.071	1.498***	1.607***
	(1.332)	(2.886)	(3.064)
RES	0.005	0.416***	0.419***
	(1.133)	(7.668)	(7.688)
SALEGR	-0.004	-0.254	-0.230
	(-0.160)	(-1.340)	(-1.243)
LOGTA	-0.004	0.500***	0.491***
	(-0.864)	(9.952)	(9.413)
LEV	0.016	0.534**	0.586**
	(0.650)	(2.099)	(2.283)
LOGSUB	0.003	0.173***	0.170***
	(0.659)	(2.887)	(2.810)
ROA	0.001**	0.004	0.003
	(2.323)	(0.835)	(0.734)
Constant	-0.524**	-3.370***	-3.227***
	(-2.047)	(-4.473)	(-4.209)
Observations	591	591	591
Adjusted R^2	0.614	0.573	0.627
Year effects	YES	YES	YES
Industry effects	YES	YES	YES
F test	77.82***	24.28***	34.80***

Source: Authors' own creation. All standard errors are clustered at firm level. Reported results include *t*-statistics in parentheses along with coefficients. All variables are defined in Table 1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$