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How Female Leadership and Auditor Affiliations Shape Audit Fees: Evidence from Egypt

Running head: Female Leadership and audit fees

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Abstract

Purpose: This study examines how female directors on corporate boards and audit committees, and auditor affiliations (Big 4 versus Egyptian firms affiliated with foreign auditors), influence audit fees. This examination is driven by the global call for increased female representation in leadership roles and its potential implications for audit quality and financial transparency.

Design/methodology/approach: A sample of non-financial companies listed on the Egyptian Stock Exchange is used for the period 2011-2020. We employed multivariate regression models, the Heckman Two-Stage and Tokenism to support our analysis.

Findings: Our results are threefold. First, our analysis reveals that female directors, whether on corporate boards or audit committees, are more likely to choose higher-quality audits in the form of high audit fees. Second, both Big 4 firms and Egyptian audit firms affiliated with foreign auditors are positively associated with audit fees and earn significant audit fee premiums. Third, a minor difference in audit fee premium could be attributed to the existence of female directors.

Research limitations/implications: Future research may expand the analysis performed in this study by investigating the characteristics related to female directors (e.g., education, experience, and age) on audit fees.

Practical implications: This study suggests insights to regulatory bodies, corporate decision-makers, auditors and corporate governance researchers. For instance, this study reveals that Big 4 are not homogenous and provide different audit quality levels together with significant audit fee premiums.

Originality/value: We extend, as well as contribute to the growing literature on female representation in corporate leadership. First, we add to the limited research in Egypt by examining the effect of female board representation on audit quality. Second, we add to the extant literature on the gender of financial experts by demonstrating that female financial expert is more likely to demand high-quality audits. Lastly, our results have significant implications for policymakers. For instance, this study reveals that Big 4 are not homogenous and provide different audit quality levels together with significant audit fee premiums.

Keywords: Female board representation; gender diversity; auditor type; audit quality; audit fees

JEL Classification M42

1. Introduction

Prior studies argue that effective boards and its subcommittees are more likely to demand higher audit quality, which may lead to higher audit fees (Abbott et al., 2003). Also, audit firm type plays a vital role to monitor executive management practices. Therefore, the interaction between audit firm type and the formation of the board is heavily linked to financial reporting quality (Behbahaninia, 2022; Davis & Garcia-Cestona, 2023; Vann and Presley, 2018). This conclusion is consistent with the agency theory and regulatory requirements (Jensen and Meckling, 1976; Quick et al., 2018). Meanwhile, gender diversity in corporate leadership and boardrooms has gained extensive attention from academics, professionals and policymakers (Abdelfattah et al., 2020; Owusu et al., 2020; Sun et al., 2011; Wang & Kelan, 2013; Zalata et al., 2022). Thus, this study examines the effect of female directors on board and audit committees and auditor types on audit fees.

In this context, the literature indicates mixed results regarding the effect of hiring big 4 audit firms and female directors on audit quality. Although much of prior research suggests that big 4 audit firms deliver a higher level of audit quality (Geiger and Rama, 2006; Jiang et al. 2019), some researchers concluded that this result is inconclusive (Park, 2017; Semba and Kato, 2019). Also, the literature suggests that gender diversity in top management may offer more effective leadership styles (Elmagrhi et al., 2021), take more conservative and ethical decisions (Carter et al., 2017; Nekhili et al., 2020). Similarly, previous studies reported that the existence of female directors is positively associated with audit quality and better-monitoring functions (e.g. Arun et al., 2015; Gonçalves et al., 2019; Huang, 2021; Lai et al., 2017; Srinidhi et al., 2011, Sun et al., 2019). However, a strand of the literature suggests that auditors are willing to reduce audit fees because females are more risk-averse and ethical (Ittonen et al., 2008). In contrast, research examining the effect of the interactions between big 4 audit firms and female directors on audit quality is largely rare. More importantly, much of previous studies depend heavily on accruals proxies to measure audit quality. Recently, a strand of research argues that such proxies might not be consistent with the perspective of regulators and audit firms concerning audit quality (Aobdia, 2019; Mnif & Tahri, 2023; Murphy et al., 2023; Ocak, 2022; Saleh Aly et al., 2023). To our knowledge, this study is among the few that explore the effects of female board participation on audit fees as proxies for audit quality in a developing context.

Our study focuses on the Egyptian context for a number of reasons. First, the literature reported social and institutional barriers to cause discrimination against women in workplaces

(Abdelzaher and Abdelzaher, 2019). According to International Finance Cooperation (IFC), Egypt is ranked 134th out of 153 countries on the Global Gender Gap Index (WEF, 2016). In addition, A recent report issued by IFC in 2019 asserts that much has to be done to grant equal opportunities to women in all aspects to close the gender gap in Egypt to improve the country's ranking. Accordingly, Financial Regulatory Authority in Egypt (FRA) amended listing rules to mandate listed companies in the Egyptian Stock Exchange to retain at least one female on the board (FRA, 2019). Thus, our study seeks to contribute to the current debate by examining the impact of female participation at the board level on audit quality over a long period, including the 2011-2020 period. Second, prior findings are marred in that they have mostly been performed in developed nations, with comparatively little attention paid to audit quality and gender diversity in developing markets (e.g., Gull et al., 2021), thus doubtfully restricting the generalisability of their results to developing countries. Egypt, for instance, has distinct accounting, auditing, governance regulations, and cultural traditions that can influence gender diversity differently on audit quality (Abdou, 2020; El-Dyasty and Elamer, 2021; Yasser and Soliman, 2018). This, consequently, provides a strong incentive for us to assess the impact of female board representation on audit fees among Egyptian listed firms.

Third, most extant literature examines the effect of either big 4 audit firms or female directors on audit fees in developed countries where female involvement in top management is more pronounced (Gull et al., 2021). We depart from much of the present research that explores the mere presence of female directors on audit fees by examining the effect that unique and different female director roles, such as the percentage, executive and monitoring roles of female directors, have on audit quality using audit fees model. Lastly and according to Egyptian company law 159/1981, a company has a right to appoint one auditor or more to audit its financial statements. In this case, a joint audit emerges, which may affect audit fees and consequently audit quality. We add to the current literature by examining the impact of auditor type (single and joint) on audit fees, which serve as proxies for audit quality.

To achieve the objectives of this study, we utilized data from non-financial companies listed on the Egyptian Stock Exchange over the period 2011-2020, using audit fees as a measure of audit quality. Our findings reveal that female directors on boards and audit committees, especially independent female directors, are associated with higher audit fees, suggesting their influence on demanding higher audit quality. Additionally, Big 4 audit firms command higher fees, indicating they may deliver superior audit quality in Egypt, which diverges from some prior studies (El-Dyasty and Elamer, 2021; Yasser and Soliman, 2018). Further analyses show a positive link between Egyptian audit firms affiliated with foreign firms and audit fees. Our

results also highlight that female directors can positively impact audit quality without leading to higher fee premiums, suggesting that increasing female representation could enhance financial reporting quality. Finally, both Big 4 and internationally affiliated Egyptian audit firms are able to secure significant audit fee premiums in the Egyptian market.

This study contributes to existing research in several ways. First, we add to the limited research in Egypt by examining the effect of female board representation on audit quality. Our study supports extant literature by providing further evidence that female directors are more likely to demand high-quality audits. We achieve this distinctively by employing the audit fees model. This approach is consistent with recent research (Aobdia, 2019) that argues that this approach overcomes the weaknesses of accruals models. Second, this study contributes to the limited research by employing a large dataset on female board representation, corporate governance and audit fees from 2011 to 2020 in a developing country (i.e., Egypt). Third, we add to the extant literature on the gender of financial experts (Abbasi et al., 2020) by demonstrating that female financial expert is more likely to demand high-quality audits. Lastly, our results have significant implications for policymakers. For instance, this study reveals that Big 4 are not homogenous and provide different audit quality levels together with significant audit fee premiums.

The remainder of this paper is organized as follows. In the next section, a Literature review and the hypotheses are provided. The research design is described in section 3. In section 4, empirical results and discussion are presented. Finally, section 5 contains the summary and conclusion.

2. Literature Review and Hypotheses Development

2.1 Board Gender Diversity

Extensive research underscores the significance of board and audit committee characteristics in enhancing financial reporting quality. The independence, diligence, and expertise of these members are crucial for effective monitoring and ensuring integrity in financial reporting (Alqatan et al., 2021; Eldaly et al., 2022; El-Dyasty & Elamer, 2021, 2022; Lim & Lee, 2022). Upper echelons theory supports this perspective, emphasizing that the strategic decisions of leaders, including those related to gender diversity, significantly impact organizational outcomes and are often reflected in audit fees (Carcello et al., 2002; Ghafran and O'Sullivan, 2017).

Research examining the association between board characteristics and audit fees has reported mixed results. While some studies indicate a positive relationship, suggesting that robust board characteristics are associated with higher audit fees (Jizi and Nehme, 2018; Ali et al., 2018; Abbott et al., 2003; Carcello et al., 2002), others present a negative or insignificant relationship. For instance, Herranz et al. (2020) reported that audit committees with greater expertise in certain European countries paid lower audit fees. Similarly, Chan et al. (2013) found a negative association in the U.S. between audit fees and the proportion of directors with long tenures on independent audit committees. Zaman et al. (2011) and Boo and Sharma (2008) also noted insignificant or negative relationships, while Rainsbury et al. (2009) found that audit committee characteristics did not impact the level of audit fees. These diverse findings suggest a complex interaction of factors influencing audit fees, highlighting the necessity of considering broader market dynamics and auditor types.

Gender diversity on boards and audit committees is increasingly examined for its impact on financial reporting quality. Women are often noted for their risk aversion and greater compliance with regulations, traits that potentially lead to more conservative financial reporting and lower earnings management (Khlif, and Achek, 2017; Nehme and Jizi, 2018). However, the effectiveness of gender quotas in enhancing audit quality is contested. Some studies have suggested that increasing female presence does not automatically improve financial reporting quality (Sultana et al., 2020; Sun et al., 2011; Gonçalves et al., 2019; Arun et al., 2015). In emerging markets like Egypt, recent regulations underscore the importance of gender diversity on corporate boards. The 2016 corporate governance code and 2020 listing rules advocate for non-discriminatory board appointments, mandating the inclusion of at least one female member (FRA, 2019). This regulatory shift, reflecting a global trend, introduces a unique context for studying the impact of gender diversity on financial reporting quality within these economies. Based on the reviewed literature, we propose the following hypotheses:

H1a: Female directors on the audit committee are associated with audit fees.

H1b: Female directors with financial expertise on the audit committee are associated with audit fees.

H1c: Female directors on board are associated with audit fees.

H1d: Independent female directors on board are associated with audit fees.

H1e: Executive female directors on board are associated with audit fees.

2.2 Auditor Type

DeAngelo (1981) posits that large audit firms provide higher audit quality than smaller firms, justifying their ability to charge higher audit fees and thus earn a fee premium. This premium stems from attributes such as greater independence, the ability to recruit distinguished auditors, advanced audit production technology, and robustness against legal claims (Lyubimov, 2019; Carson, 2012; Fafatas and Sun, 2010). Building on Simunic's (1980) audit fee model, which assesses the impact of auditor size and client characteristics on audit fees, subsequent research has largely found a positive association between auditor size and audit fees globally. This suggests that large audit firms typically secure a fee premium (Lyubimov, 2019; Carson et al., 2012; Fafatas and Sun, 2010). However, some studies, particularly in emerging markets, report that large audit firms do not always command such premiums (Siddiqui et al., 2013). In Egypt, limited research using Simunic's model indicates that the Big 4 audit firms can earn an audit fee premium, although these findings are based on just two years of data and did not consider board and audit committee characteristics (El-Dyasty, 2017). Expanding this research to include a larger sample and integrating board and audit committee characteristics could provide a more comprehensive understanding of the factors influencing audit fees. Thus, the second hypothesis is formulated as follows:

H2: Audit firm size is positively associated with audit fees in Egypt.

3. Research Design

3.1 Measurement of Variables and Model Specification

This study will use the basic model suggested by Simunic (1980) to examine the determinants of audit fees. Thus, the natural logarithm of the sum of audit fees is used as a dependent variable. Egyptian laws permit a corporation to appoint one auditor or more. Some companies prefer to engage more than one audit firm to audit their financial statements. Accordingly, we consider the total fees paid by Egyptian companies.

The ordinary least squares regression model is used to test the research hypotheses expressed in Equation 1:

$$\begin{aligned} \text{LnFees}_{it} = & \beta_0 + \beta_1 \text{FemaleDirectors}_{it} + \beta_2 \text{BiG4}_{it} + \beta_3 \text{Joint}_{it} + \beta_4 \text{Leverage}_{it} + \beta_5 \text{Loss}_{it} + \beta_6 \\ & \text{Current}_{it} + \beta_7 \text{BSize}_{it} + \beta_8 \text{Duality}_{it} + \beta_9 \text{BIndepend}_{it} + \beta_{10} \text{CSize}_{it} + \beta_{11} \text{CExpertise}_{it} + \beta_{12} \\ & \text{ZIM}_{it} + \beta_{13} \text{Inherent}_{it} + \beta_{14} \text{OCFlowe}_{it} + \beta_{15} \text{Complex}_{it} + \beta_{16} \text{LnTAssets}_{it} + \beta_{17} \text{Return}_{it} \\ & + \text{Year_FE} + \text{Industry_FE} + \varepsilon_{it} \end{aligned} \quad (1)$$

Consistent with the literature, this study uses audit fees as a measure of audit quality. For example, DeFond and Zhang (2014) explained the advantages of employing audit fees to measure audit quality. Audit fees are continuous and thus can capture subtle variation in quality. In addition, R-Squares often exceed 70%. Accordingly, this may alleviate concern about correlated omitted variables. Furthermore, Aobdia (2019) reported that regulators and audit firms consider audit fees as one of the only three agreeable proxies of audit quality.

Two main independent variables are used. The first independent variable is female directors. Five sub-variables are employed to test the research hypotheses. Table 1 defines these variables. The first proxy is the percentage of female directors on the board (*Bfemale*). The second proxy is the number of independent female directors on the board (*BFemaleIndend*). The third proxy is the number of executive female directors on the board (*BFemaleExe*). The fourth proxy is the percentage of female directors on the audit committee (*CFemale*). The fifth proxy is the existence of a female director on the audit committee which is a dummy variable equal to 1 when a female director on the audit committee has expertise in accounting, 0 otherwise (*CFemaleExpert*). The second main independent variable is auditor type (*BIG4*), which is a dummy variable equal to 1 if a Big 4 audit firm exists and 0 otherwise.

Consistent with the literature (Drogalas et al., 2020; Sellami and Cherif, 2020; Nekhili et al., 2020; Miglani and Ahmed, 2019), the current study controls for possible omitted variables bias by including a number of control variables that may influence audit fees. Table 1 defines the control variables, firm loss (*Loss*), current ratio (*Current*), Board size (*BSize*), CEO Duality (*Duality*), board independence (*BIndepend*), size of the audit committee (*CSize*), financial expertise on audit committee (*CExpertise*), financial stress score (*ZIM*), inherent risk (*Inherent*), operating cash flow to total assets (*OCashFlow*), Firm complexity (*Complex*), Firm size (*LnTAssets*), return on assets (*Return*), year fixed effects (*Year_FE*), and industry fixed effects (*Industry_FE*).

3.2 Sample Selection and Data Sources

Our sample is drawn from all non-financial companies listed in the Egyptian stock exchange spanning the period 2011 - 2020. 2006 company-year observations are available for 210 companies. Board and audit committee data are not available before 2011. Data was collected manually from the companies' websites, the Egyptian stock of exchange (EGX) site, and a financial website called Muabsher. Only PDF official version of annual unconsolidated financial statements, minutes of the general assembly meeting, and other forms required EGX to disclose corporate governance data were considered. EGX is not enforcing listed companies

to disclose audit fee data. Therefore, only 935 company-year observations could be used as displayed in Table 2.

4. Empirical Results and Discussion

4.1 Descriptive Statistics and Bivariate Analyzes

Table 3 provides descriptive statistics for the variables in our study. It indicates that Big 4 audit firms account for 35% of the sample, while audit firms affiliated with foreign firms represent 74% of the sample. This supports prior findings that Big 4 firms do not dominate the Egyptian market (El-Dyasty and Elamer, 2021). Joint audits constitute 13% of the sample. In terms of board structure, the chairman also serving as CEO is seen in 60% of the companies, and board independence stands at 74%. Female representation is notably low, with only 7% of female directors in executive roles and women making up just 10% of board directors. This statistic underpins the recent amendments by the FRA to boost female participation on boards, aiming to leverage the unique skills of women and promote equality. Within audit committees, only 41% of members have financial expertise, and a mere 11% are female. Furthermore, only 6% of female audit committee members possess financial expertise. Overall, Table 3 highlights a significant spread across all variables under study, reflecting a diverse dataset.

The (untabulated) correlation matrix shows that the two types of audit firms have a significant association with audit fees. Except for independent female directors on the board, none of the variables representing female directors has a significant association with audit fees. Independent female directors have a positive relationship with audit fees. In general, the extent of correlation coefficients among all examined variables is relatively low, indicating that there are no severe multicollinearity issues.

4.2 Multivariate Regression Results

Table 4 presents the regression analysis to test the research hypotheses. Five models are performed to obtain the effect of the five variables representing female board representation on audit fees. For all the five models, regression results indicate that all models predict the dependent variable significantly. First, our results reveal that three variables representing female directors have a significant and positive association with audit fees. Consequently, the greater percentage of female directors on the board and audit committee the greater the amount of audit fees (Coefficient = 0.653 and 0.321, respectively; all p-values < 0.01). Accordingly, both H_{1a} and H_{1c} are supported. Second, Table 4 indicates that the increase in the number of independent female directors increases audit fees (Coefficient = 0.099; p-values < 0.01),

leading to support H_{1d} . This implies that female directors demand higher audit quality in Egyptian companies. This outcome is consistent with prior research (Sellami and Cherif, 2020; Bhuiyan et al., 2020; Lai et al., 2017). Third and on the other hand, the number of executive female directors and the existence of female directors who possess financial expertise has an insignificant relationship with audit fees (Coefficient = -0.013 and 0.129, respectively). Subsequently, H_{1b} and H_{1d} are not supported. This result is not compatible with prior research (Abbasi et al., 2020; Harjoto et al., 2015; Huang et al., 2014). In general, these results reinforce that, for our sample, the relationship between female board representation and audit fees is positive and significant.

Fourth, all models show a strong and positive association between Big 4 audit firms and audit fees (Coefficient = 0.656, 0.671, 0.655, 0.660, and 0.646, respectively; all p-values < 0.01). This result implies that Big 4 deliver a higher level of audit quality. Thus, H_2 is supported. Finally and regarding control variables, Table 4 shows that most of the corporate governance elements are negatively or insignificantly associated with audit fees. What is striking in this regard is to notice that the existence of financial expertise on the audit committee is significantly and negatively related to audit fees. This result is consistent with some prior research (e.g., Herranz et al., 2020). This result could be explained as such an audit committee would like to serve as an insurer of audit quality rather than demanding an external auditor to do so. Additionally, the joint audit is significantly and positively associated with audit fees. This result may support the notion that joint audits may lead to achieving higher audit quality.

4.3 Additional Analysis

We conduct a battery of additional analyses to test the robustness of our results as follows.

Egyptian audit firms affiliate with foreign audit firms

Table 5 presents a regression analysis assessing the persistence of previously reported findings when considering Egyptian audit firms affiliated with foreign firms. Prior research (El-Dyasty and Elamer, 2021) suggests that these firms deliver superior audit quality compared to the Big 4, using earnings management as a measure. This analysis is crucial for two reasons: firstly, to determine if female directors influence audit quality by engaging with these affiliated firms, and secondly, to explore whether such affiliations enable firms to command premium audit fees—a significant factor given their dominance in the Egyptian audit market. No previous studies have examined this specific issue.

The regression analysis reveals that four of the five variables related to female directors—proportion of female directors, number of independent female directors, female directors on the audit committee, and those with financial expertise—are significantly and positively associated with audit fees (Coefficients = 0.488, 0.058, 0.257, and 0.164 respectively; all p-values < 0.05), suggesting an increase in audit quality. However, the presence of female executive directors does not significantly impact audit quality.

Additionally, all models in Table 5 show a robust positive relation between affiliations with foreign audit firms and audit fees, indicating that these firms likely provide a higher level of audit quality, as evidenced by the calculated audit fee premiums. Notably, these premiums have significantly decreased from those attributed to the Big 4 in earlier analyses (Table 4). Consequently, it appears Egyptian companies now uniformly regard all local firms affiliated with foreign firms as equivalent to the Big 4 in terms of audit quality, negating any need to pay higher fees for marginal quality differences.

Audit fee premium.

Two key questions emerge from this study. First, does the representation of female directors on boards and audit committees significantly affect audit quality? Descriptive statistics show a low percentage of female directors in Egyptian companies, and the difference in audit fee premiums with and without female directors in the regression model is minor. This suggests that female directors may not significantly impact the demand for higher audit quality, a crucial insight for Egyptian regulators. Second, which audit firms command a premium on audit fees as a measure of audit quality? The study finds that both Big 4 and Egyptian audit firms affiliated with foreign firms generally deliver higher audit quality. Rerunning the regression model to focus solely on auditor types, including the Big 4, enhances our understanding of audit quality dynamics in the Egyptian market.

Audit fee premiums are calculated using the formula from Craswell et al. (1995): Audit fee premium = $e^z - 1$, where z is the auditor type's coefficient from the regression model and e is the base of the natural logarithm (approximately 2.718).

Table 6, excluding variables related to female directors, reveals that all Big 4 firms except Deloitte earn substantial audit fee premiums, suggesting a perceived higher quality of services. However, this conclusion should be tempered by the uneven market share distribution among these firms and the limited representation of female directors in the sample, which might change following regulatory mandates to increase female board participation. This table shows

significant fee premiums for PWC, KPMG, and EY, with a notable disparity between them, underscoring the non-uniform quality across the Big 4.

Heckman Two-Stage Procedure

Our main results might be subject to the potential problem of sample selection bias if audit fees and female directors are endogenously determined. To address this issue, we employ a two-stage model as developed by Heckman (1976). We apply a Probit model to calculate the inverse Mills ratio (*Mills*), portraying the antecedents of female directors' representation on the board and audit committee. This probit model includes all our control variables in the main analysis. In the second stage, we run our main regression models of Table 4 by additionally including *Mills* that was calculated from the first stage, as an independent variable along with the control variables. Table 7 shows that gender diversity of the board and audit committee is positively associated with audit fees. Contrary to our main results, female executive directors load negatively and are significant at a 10% level. This indicates that our results remain qualitatively consistent and robust. This shows that our findings stated under the main analysis are not impaired by the self-selection bias issue.

Tokenism

Extant literature indicates that several firms appoint a single female director as a tokenism to comply with regulators' expectations and societal pressures (Lai et al., 2017). To investigate the above tokenism view, we create one proxy for the female directors' participation. Especially, we define Female2 as a dummy variable takes 1 if a company has at least two female directors and 0 otherwise. Model 6 of Table 7 suggests a positive and significant relationship between female directors participation and audit fees as a proxy of audit quality. Specifically, Female2 is statistically significant and positive.

High-performing and poorly performing firms

This section examines how firm performance influences the relationship between female directors' participation and audit fees. We divided our sample based on return on assets—above and below the mean—and conducted regression analyses for each subgroup.

The unreported results reveal distinct patterns: high-performing firms show a strong positive relationship between female directors' participation and audit fees, indicating that these firms value and potentially reward gender diversity with higher audit fees. In contrast, this

relationship is not statistically significant for poorly performing firms, suggesting no clear association in this subgroup. Similarly, the connection between female directors on audit committees and audit fees is only positive for high-performing firms. Additionally, the analysis shows that Big 4 firms tend to charge higher audit fee premiums to poorly performing firms compared to their better-performing counterparts. Overall, these findings imply that high-performing firms are more likely to seek high-quality audits and pay lower audit fee premiums as a reflection of their strong performance, a trend not observed in poorly performing firms.

5. Summary and Conclusion

Inspired by recent amendments by the FRA to empower women and enhance board and audit committee effectiveness on the Egyptian Stock Exchange, this study examines the impact of female directors and auditor type on audit quality using data from non-financial companies listed from 2011 to 2020. The findings indicate that female directors likely improve audit quality, as evidenced by higher audit fees correlated with the percentage of female directors on boards and audit committees, and the presence of independent female directors. Additionally, Big 4 audit firms command higher fees, suggesting higher audit quality. The study also finds only minor differences in audit fees when variables related to female directors are included or excluded, suggesting that the amendments to the listing rules might enhance audit quality without additional costs. Further analysis shows that significant audit fee premiums are primarily achieved by Big 4 and Egyptian audit firms affiliated with foreign firms. Moreover, well-performing firms are more inclined to demand high-quality audits but pay lower audit fee premiums, highlighting the nuanced dynamics of audit pricing in the context of regulatory changes in the Egyptian market.

This study contributes to the existing literature in main four ways. First, this study offers new evidence regarding the effect of female directors on audit quality in emerging markets. Most of the prior research was conducted in developed countries and use a limited number of variables related to female directors. No prior research in Egypt investigated the relationship between female directors and audit quality. The current study shed light on this issue. This can give further support to current initiatives from the Egyptian regulators and policymakers to empower gender diversity to improve female participation in the top management. Second, this study reports the effect of auditor type on audit fees. The results imply that Big 4 or audit firms affiliated with foreign auditors are associated with better audit quality. Third, our results have significant implications for policymakers. For instance, this study reveals that Big 4 are not

homogenous and provide different audit quality levels. This result may be attributed to the limited share of PWC and Deloitte in the Egyptian market. It may be also attributed to the exaggeration of audit fees demanded by Big 4 audit firms. Either of these two explanations may induce the emergence of a new tier called Egyptian audit firms affiliate with foreign firms. This can work as a driver for the Egyptian regulators and policymakers to find pathways to enhance the implementation and enforcement of audit quality policies and laws. Fourth, Big 4 secure a significant audit fee premium ranges between 16% and 233%. Future studies may explore the determinants of this high premium. Fifth, future studies may extend our work by comparing the consequences of female board participation in both developing and developed contexts.

Despite the robustness of our findings, this study has limitations. Firstly, it only covers 55 percent of available data, as disclosure of audit and non-audit fees is not mandatory for companies listed on the Egyptian Stock Exchange. The FRA could enhance transparency by requiring such disclosures, aligning with global standards. Secondly, future research could benefit from qualitative methods like interviews or case studies with directors to deepen understanding of how gender diversity impacts audit fees and quality. Lastly, expanding this research to other developing regions in Africa, South America, and Asia could provide insights into the effects of diverse legal and cultural contexts on audit practices.

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Tables

Table 1: Variable Definitions

Variables	Definition
LnFees	Natural logarithm of total audit fees
BFemaleExe	Number of executive female directors in the board
BFemaleIndend	Number of independent female directors in the board
BFemale	Percentage of female directors on the board
CFemale	Percentage of female directors on the audit committee
CFemaleExpert	Dummy variable equals 1 when one female director on the audit committee has expertise in accounting, 0 otherwise
BSize	Number of board's directors
Duality	Dummy variable equals 1 when the <i>CEO</i> also holds the position of the chairman of the board of directors, 0 otherwise
BIndepend	Percentage of non-executives members of the board of directors
CSize	Number of directors on the audit committee
CExpertise	Dummy variable equals 1 when one director on the audit committee has expertise in accounting, 0 otherwise
Foreign	Dummy variable equals 1 if any of the Egyptian audit firms that affiliate with a foreign audit firm exist, 0 otherwise
Big4	Dummy variable equals 1 if a Big 4 audit firm exists, 0 otherwise
Joint	Dummy variable equals 1 if a Joint audit firm exists, 0 otherwise
Leverage	Total liabilities divided by total assets
Loss	Dummy variable equal to 1 if earnings are negative, 0 otherwise
Current	Current assets divided by current liabilities
Zim	Financial stress score, calculated from Zmijewski's (1984) model
Inherent	(Accounts receivable + Inventory) / total assets
OCashFlow	Operating cash flows/total assets in the prior year
LnAge	Natural logarithm of the company age
Complex	Sales/total assets in the prior year
LnTAssets	Natural logarithm of total assets
Return	Net income / total assets

Table 2: Sample selection

Year	All	Banks and other financial institutions	Non-financial companies	Sample
2020	236	45	191	171
2019	247	46	201	182
2018	252	48	204	168
2017	254	46	208	161
2016	254	44	210	175
2015	252	43	209	181
2014	247	41	206	173
2013	236	42	194	172
2012	235	42	193	161
2011	232	42	190	142
Sum	2445	439	2006	1686
Less: the data with missing variables				751
Final sample				935

Table 3: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
LnFees	935	11.35	1.06	9.21	18.91
BFemaleIndend	935	0.75	1.06	0.00	8.00
BFemale	935	0.10	0.12	0.00	0.66
BFemaleExe	935	0.07	0.28	0.00	2.00
CFemale	935	0.11	0.18	0.00	1.00
CFemaleExpert	935	0.06	0.25	0.00	1.00
Big4	935	0.35	0.48	0.00	1.00
Foreign	935	0.74	0.44	0.00	1.00
Joint	935	0.13	0.33	0.00	1.00
Leverage	935	0.43	0.41	0.00	8.77
LossSign	935	0.23	0.42	0.00	1.00
CurrentRatio	935	4.09	11.41	0.05	150.28
BSize	935	8.14	2.83	3.00	17.00
Duality	935	0.60	0.49	0.00	1.00
BIndepend	935	0.74	0.18	0.00	1.00
CSize	935	3.46	0.95	1.00	8.00
CExpertise	935	0.41	0.49	0.00	1.00
Zim1	935	0.11	0.22	0.00	1.00
Inherent	935	0.41	0.28	0.00	2.79
OCFlow	935	0.05	0.13	-0.70	1.19
Complex	935	0.72	0.84	-0.03	6.83
LnAssets	935	20.23	1.76	13.23	25.04
Return	935	0.05	0.16	-1.24	3.41

Table 4: Female board representation, Big 4 and audit fees

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
BFemale	0.653*** (4.32)				
BFemaleIndend		0.099*** (5.77)			
BFemaleExe			-0.013 (-0.18)		
CFemale				0.321*** (2.63)	
CFemaleExpert					0.129 (1.65)
Big4	0.656*** (14.25)	0.671*** (14.72)	0.655*** (13.73)	0.660*** (14.08)	0.646*** (13.36)
Joint	0.363*** (5.26)	0.350*** (5.08)	0.379*** (5.39)	0.365*** (5.26)	0.378*** (5.44)
Leverage	0.085** (2.04)	0.084** (1.97)	0.078* (1.80)	0.084* (1.95)	0.078* (1.79)
LossSign	0.047 (1.03)	0.046 (1.03)	0.050 (1.11)	0.051 (1.11)	0.051 (1.15)
CurrentRatio	-0.004** (-2.43)	-0.004** (-2.46)	-0.003** (-2.09)	-0.004** (-2.36)	-0.003** (-2.08)
BSize	0.011 (1.25)	0.002 (0.27)	0.015 (1.52)	0.011 (1.34)	0.013 (1.51)
Duality	-0.233*** (-5.78)	-0.239*** (-5.93)	-0.213*** (-5.26)	-0.218*** (-5.49)	-0.216*** (-5.38)
BIndepend	-0.050 (-0.32)	-0.100 (-0.65)	-0.101 (-0.59)	-0.100 (-0.65)	-0.111 (-0.71)
CSize	-0.009 (-0.47)	-0.007 (-0.38)	-0.012 (-0.60)	-0.007 (-0.35)	-0.014 (-0.72)
CExpertise	-0.124*** (-3.15)	-0.131*** (-3.33)	-0.139*** (-3.36)	-0.137*** (-3.41)	-0.151*** (-3.74)
Zim1	-0.167* (-1.73)	-0.167* (-1.72)	-0.190* (-1.96)	-0.178* (-1.84)	-0.182* (-1.88)
Inherent	-0.054 (-0.57)	-0.063 (-0.66)	-0.093 (-0.98)	-0.081 (-0.84)	-0.074 (-0.77)
OCashFlow	0.000 (0.64)	0.000 (0.77)	0.000 (0.51)	0.000 (0.54)	0.000 (0.61)
Complex	0.010 (0.37)	0.017 (0.63)	0.013 (0.50)	0.012 (0.45)	0.010 (0.39)
LnAssets	0.317*** (19.53)	0.313*** (19.59)	0.310*** (18.88)	0.313*** (19.58)	0.313*** (19.39)
Return	0.164 (1.07)	0.165 (1.05)	0.190 (1.27)	0.178 (1.15)	0.187 (1.26)
_cons	4.146*** (12.04)	4.311*** (12.90)	4.391*** (12.49)	4.322*** (12.95)	4.357*** (12.92)
Year	Yes	Yes	Yes	Yes	Yes
Sector	Yes	Yes	Yes	Yes	Yes
N	935	935	935	935	935
R-sq	0.73	0.73	0.73	0.73	0.73
Audit fee premium	0.927	0.956	0.925	0.935	0.908

This table reports regression coefficients and t-statistics in parentheses; *p < 0.10; **p < 0.05; ***p < 0.01.

Table 5: Female board representation, audit firm affiliated with a foreign firm and audit fees

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
BFemale	0.488*** (3.02)				
BFemaleIndend		0.058*** (3.17)			
BFemaleExe			-0.045 (-0.61)		
CFemale				0.257** (2.06)	
CFemaleExpert					0.164** (2.17)
Foreign	0.572*** (11.77)	0.570*** (11.64)	0.586*** (12.05)	0.583*** (11.76)	0.574*** (11.44)
Joint	0.510*** (7.58)	0.508*** (7.51)	0.519*** (7.63)	0.511*** (7.55)	0.517*** (7.68)
Control variables	Included	Included	Included	Included	Included
Year	Yes	Yes	Yes	Yes	Yes
Sector	Yes	Yes	Yes	Yes	Yes
N	935	935	935	935	935
R-sq	0.71	0.71	0.71	0.71	0.71
Audit fee premium	0.772	0.768	0.797	0.791	0.775

This table reports regression coefficients and t-statistics in parentheses; *p < 0.10; **p < 0.05; ***p < 0.01.

Table 6: Results of regression analysis for auditor types without variables of female directors

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Big4	0.655*** (13.79)					
Foreign		0.584*** (11.82)				
EY			0.194*** (3.34)			
KPMG				0.520*** (9.05)		
Deloitte					0.146 (1.33)	
PWC						1.204*** (7.55)
Joint	0.380*** (5.45)	0.521*** (7.72)	0.535*** (7.14)	0.528*** (7.03)	0.567*** (7.37)	0.613*** (7.94)
Control variables	Included	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included	Included
N	935	935	935	935	935	935
R-sq	0.73	0.71	0.67	0.69	0.67	0.70
Audit fee premium	0.925	0.793	0.214	0.682	0.157	2.333

This table reports regression coefficients and t-statistics in parentheses; *p < 0.10; **p < 0.05; ***p < 0.01.

Table 7: Tokenism and the 2SLS regression of female board representation, Big 4 and audit fees

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
BFemale	0.666*** (3.99)					
BFemaleIndend		0.100*** (4.89)				
BFemaleExe			-0.150* (-1.78)			
CFemale				0.315*** (2.91)		
CFemaleExpert					0.064 (0.68)	
Female2						0.114** (2.19)
Big4	0.708*** (10.82)	0.626*** (9.14)	1.021*** (11.54)	0.691*** (11.84)	0.912*** (3.52)	0.657** *
Joint	0.327*** (4.72)	0.349*** (5.67)	-2.126*** (-4.18)	0.433*** (4.59)	0.369*** (3.78)	0.369** *
Mills	0.609 (1.16)	-0.424 (-0.93)	3.492*** (4.80)	0.788 (0.95)	0.255 (0.63)	-
_cons	4.036*** (11.92)	4.463*** (12.47)	10.336*** (7.68)	3.847*** (6.47)	3.439*** (3.50)	4.296** *
Control variables	Included	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included	Included
Sector	Included	Included	Included	Included	Included	Included
N	935	935	935	935	935	935
R-sq	0.73	0.73	0.72	0.73	0.73	0.73
Audit fee premium	1.030	0.870	1.776	0.996	1.489	0.929